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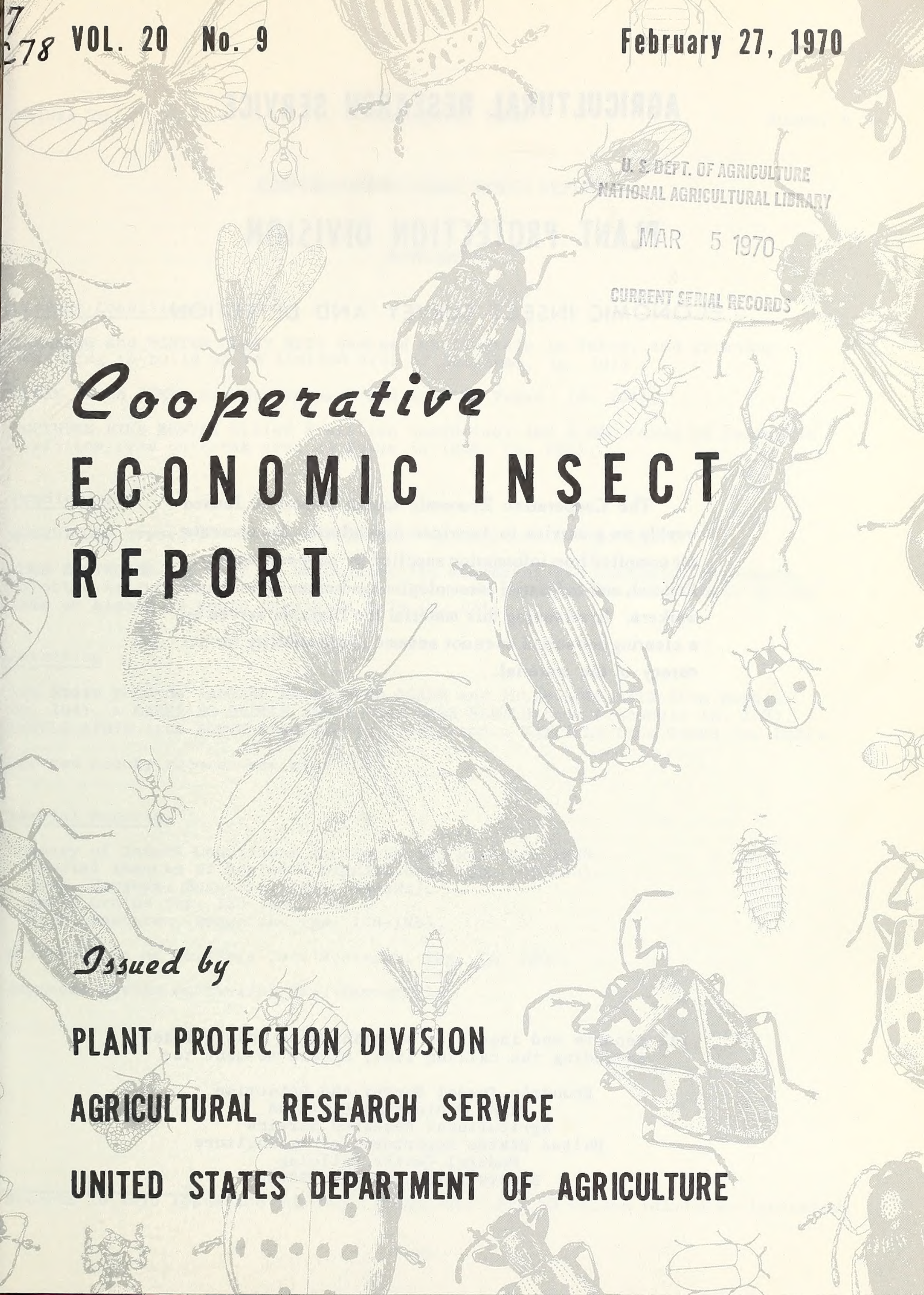

Cooperative
ECONOMIC INSECT REPORT

Issued by

PLANT PROTECTION DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PROTECTION DIVISION

ECONOMIC INSECT SURVEY AND DETECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 20 February 27, 1970 Number 9

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

GREENBUG and WINTER GRAIN MITE damaged small grain in Texas, and greenbug beginning to build up in limited area of Oklahoma. (p. 101).

GREEN PEACH APHID damaged spinach and kale in Texas. (p. 101).

SOUTHERN PINE BEETLE killed 8 million board feet and 8,000 cords of lumber in 6-million acre outbreak area of Texas in 1969. (p. 102).

Predictions

MOSQUITOES expected to be heavy in 1970 in California. (p. 103).

CORN ROOTWORMS expected to be economic in southeast and southwest Minnesota, expected to increase in Nebraska (p. 119), and populations expected to be the same or higher in South Dakota in 1970 (p. 121).

Detection

New State records include an ARMORED SCALE and TULIP BULB MITE from Hawaii (p. 104), a DARKLING BEETLE and a FLAT BARK BEETLE from Wisconsin (p. 103), SPRUCE APHID from NORTH CAROLINA (p. 103), and a WHITEFLY from Texas (p. 102).

For new county records see page 104.

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  Corn, Sorghum, Sugarcane (pp. 114-122).
  Small Grains (pp. 123-125).
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Distribution of Northern Corn Rootworm. Map. (p. 120).

Japanese Beetle Quarantine Map. Centerfold.

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WEATHER OF THE WEEK ENDING FEBRUARY 23

HIGHLIGHTS: Last week was the sixth consecutive warm week in much of the West and the third consecutive cool week in the East. The heaviest rains fell along the northern Pacific coast and in the Southeast from northern Florida and southern Virginia.

PRECIPITATION: Two storms brought generous precipitation to the United States early in the week. A Pacific storm lashed the coasts of Washington, Oregon, and northern California with strong winds and heavy rain with snow in the higher elevations. The wind gusted to 85 m.p.h. at Cape Blanco, Oregon, Monday forenoon. Another storm in the southeast spread showers and a few thunderstorms from Alabama to the Virginias, Maryland, and Delaware. A heavy downpour dumped 9.21 inches of rain at Elgin Air Force Base in the Florida Panhandle in 24 hours, ending at 7 p.m. Monday. Freezing rain fell in the northern sections of this precipitation belt. Light snow fell early in the week in the northern Great Plains and the Great Lakes region. Strong winds raced down the eastern slope of the central Rocky Mountains and across the nearby Great Plains, kicking up considerable dust late Tuesday night in eastern Colorado and the western portions of Nebraska and Kansas. Light showers or snow flurries occurred in New York and New England late in the week. Scattered rains began in western Texas Friday and spread eastward Saturday. Light rain fell in Arizona late in the week with snow flurries above 4,000 feet

TEMPERATURE: Arctic air pushed into the northern Great Plains early in the week and spread eastward and southward. Subzero temperatures were confined mostly to North Dakota on Monday morning but were common in eastern South Dakota, Minnesota, and Wisconsin by midweek. Midday temperatures were below zero in parts of North Dakota and Minnesota on Wednesday. Warm, southerly winds brought gulf air northward across the central Great Plains early in the week. Western Kansas warmed to the 80's on Tuesday and Rapid City, South Dakota, registered 66°, the same as at Tampa, Florida, airport. On Wednesday, both St. Louis, Missouri, and Tampa, Florida, registered 60°. But by Thursday morning, St. Louis with 17° was 37° colder than Tampa. As the very cold arctic air advanced southward, temperature drops of 40° or more in 10-12 hours were common in Missouri and Arkansas. However, gulf air continued to warm the extreme Southeast. Savannah, Georgia, registered 44° Tuesday afternoon, but by Thursday had warmed to 74°. Weather of the week continued on page 128.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

GREENBUG (Schizaphis graminum) - NEW MEXICO - Generally light, ranged 3-12 per linear foot, on wheat in Quay, Curry, and Roosevelt Counties. (Mathews). TEXAS - Light to moderate in Wichita, Young, Dickens, and Motley Counties. Damaged small grain in Foard, Haskell, and Jones Counties. (Boring, Feb. 13). OKLAHOMA - Light to moderate in wheat in Kingfisher County. Beginning to build up in few areas of county. (Okla. Coop. Sur.). KANSAS - Surveys negative in wheat in Johnson, Osage, Shawnee, and Wabaunsee Counties. (Iselin).

CORN LEAF APHID (Rhopalosiphum maidis) - NEW MEXICO - Ranged up to 8 per square foot on barley in Luna County. (Campbell).

CORN, SORGHUM, SUGARCANE

WESTERN CORN ROOTWORM (Diabrotica virgifera) - WISCONSIN - Adults collected from corn silks in Winnebago and Waushara Counties by H. Hauser in August 1969. These are new county records. (Wis. Ins. Sur.).

SMALL GRAINS

WINTER GRAIN MITE (Penthaleus major) - TEXAS - Light to moderate on small grain in Archer and Young Counties. Damaged some fields in Jones County. Medium in isolated fields of oats in Blanco and Bell Counties. Damage ranged 50-75 percent in isolated fields near Johnson City. (Boring, Feb. 13).

GREEN PEACH APHID (Myzus persicae) - CALIFORNIA - This species, Rhopalosiphum padi, and Chirothrips mexicanus (a thrips) infested 160 acres of barley at Imperial, Imperial County. (Cal. Coop. Rpt.).

FORAGE LEGUMES

ALFALFA WEEVIL (Hypera postica) - MISSISSIPPI - Larvae averaged 1.6 per 20 stems of alfalfa in Pontotoc County. (Pitre).

PEA APHID (Acyrthosiphon pisum) - NEW MEXICO - Light, ranged 6-25 per square foot, on alfalfa in Quay, Curry, and Roosevelt Counties. (Mathews).

COLE CROPS

GREEN PEACH APHID (Myzus persicae) - TEXAS - Damaged spinach and kale in Uvalde County. Aerial applicators in area indicated difficulty in control. (Smith, Feb. 13).

GENERAL VEGETABLES

GREEN PEACH APHID (Myzus persicae) - CALIFORNIA - Nymphs 2 per leaf in 80 acres of parsnip at Thermal, Riverside County. (Cal. Coop. Rpt.).

THRIPS - NEW MEXICO - Populations near treatment levels on onions in Dona Ana County. (Campbell).

DECIDUOUS FRUITS AND NUTS

PEAR PSYLLA (Psylla pyricola) - OREGON - Heavy on pear trees at Hood River, Hood River County. Oviposition began February 17. (Piefer).

CITRUS

Citrus Insect Situation in Florida - Mid-February - CITRUS RUST MITE (Phyllocoptruta oleivora) infested 75 (norm 61) percent of groves; economic in 45 (norm 42) percent. Decrease expected to remove population from high range for first time in 12 months. Will be slightly above normal and may increase. Highest districts west, east, and north. CITRUS RED MITE (Panonychus citri) infested 43 (norm 36) percent of groves; economic in 14 (norm 14) percent. Population near normal and in low range. Little change expected. Highest districts west and north. TEXAS CITRUS MITE (Eutetranychus banksi) infested 23 (norm 31) percent of groves; economic in 6 (norm 11) percent. Population below normal, will remain very low. Highest district west. SIX-SPOTTED MITE (Eotetranychus sexmaculatus) infested 2 percent of groves; none economic. Gradual increase expected. GLOVER SCALE (Lepidosaphes gloverii) infested 78 (norm 78) percent of groves; economic in 7 (norm 17) percent. Population below normal and moderate; little change expected. Highest districts east and west. PURPLE SCALE (L. beckii) infested 70 (norm 77) percent of groves; economic in 7 (norm 9) percent. Population near normal and moderate, except north district with 2 percent of groves heavily infested. Little change expected. CHAFF SCALE (Parlatoria pergandii) infested 42 (norm 64) percent of groves; economic in 2 (norm 10) percent. Population expected to remain below normal and low in all districts. BLACK SCALE (Saissetia oleae) infested 18 (norm 36) percent of groves; economic in 3 (norm 15) percent. Will remain subnormal and very low in all districts. YELLOW SCALE (Aonidiella citrina) infested 60 (norm 62) percent of groves; economic in 8 (norm 14) percent. Decreased slightly. Will remain low to moderate in most districts. Few scattered heavy infestations. Highest district north. An ARMORED SCALE (Unaspis citri) infested 25 percent of groves; moderate to heavy in 8 percent. Population highest on record for month and will increase. WHITEFLY population above normal for January, may enter high range. (W.A. Simanton (Citrus Expt. Sta., Lake Alfred)).

CALIFORNIA RED SCALE (Aonidiella aurantii) - CALIFORNIA - Heavy on citrus at Arvin, Kern County. (Cal. Coop. Rpt.).

ORNAMENTALS

A WHITEFLY (Aleyrodes spiraeoides) - TEXAS - Specimens collected on iris at El Paso, El Paso County, November 6, 1969 by R.M. Eads. Determined by L.M. Russell. This is a new State record. (Green).

FOREST AND SHADE TREES

SOUTHERN PINE BEETLE (Dendroctonus frontalis) - TEXAS - Populations decreased. Last detection flight of season resulted in only 20 new multiple-tree spots over 6-million acre outbreak area. Total of 861 multiple-tree spots of 69,337 trees, controlled. About one-third level of 1968. Cooperators report 8 million board feet and 8,000 cords of infested timber killed in 1969. Salvage continued as primary control; 70+ percent of volume removed for commercial use. This is increase of 15 percent over 1968 and 30 percent over 1967. Southern pine beetle reported in lawn trees in Longview, Gregg County. A record northward extension of outbreak area; about 50 miles north of known infestations. Flights for 1970 will start in mid-January. (Mason, For. Pest Activity Rpt., Oct.-Dec.).

BLACK TURPENTINE BEETLE (Dendroctonus terebrans) - TEXAS - Infestations noticeable, direct controls not required. Activity heaviest in Trinity, Shelby, and Angelina Counties. (Mason, For. Pest Activity Rpt., Oct.-Dec.).

ENGRAVER BEETLES (Ips spp.) - TEXAS - Population levels high through summer, decreased steadily during October and November with cool weather. About 200 trees controlled. (Mason, For. Pest Activity Rpt., Oct.-Dec.).

A BARK BEETLE (Phloeosinus cupressi) - CALIFORNIA - Medium on Italian cypress nursery stock at Santa Paula, Ventura County. (Cal. Coop. Rpt.).

A FLAT BARK BEETLE (Pediacus depressus) - WISCONSIN - Specimen collected in blacklight trap in warehouse in Milwaukee County by W.F. Simmons and R. Edmonds during first week of August 1969. Determined by T.J. Spilman. This is a new State record. (Wis. Ins. Sur.). Feeds beneath bark of trees. (PPD).

NANTUCKET PINE TIP MOTH (Rhyacionia frustrana) - TEXAS - Heavy on planted loblolly and shortleaf pines throughout eastern part of State. Particularly severe near San Augustine, San Augustine County, and Kay, Harris County. (Mason, For. Pest Activity Rpt., Oct.-Dec.).

SPRUCE APHID (Elatobium abietinum) - NORTH CAROLINA - Colonies fed on needles of ornamental white spruce (Picea glauca) at Bent Creek Experimental Forest near Asheville, Buncombe County, December 7, 1967. Collected by G.F. Fedde. Determined by L.M. Russell. This is a new State record and first record of this species in eastern United States. (Fedde).

EASTERN TENT CATERPILLAR (Malacosoma americanum) - FLORIDA - Eggs hatched at Gainesville, Alachua County, February 10-16 on wild plum and black cherry. (Hetrick).

MAN AND ANIMALS

SCREW-WORM (Cochliomyia hominivorax) - No cases reported in U.S. February 15-21. Total of 34 laboratory-confirmed cases reported in portion of Barrier Zone in Republic of Mexico February 8-14 as follows: Sonora 24, Chihuahua 7, Nuevo Leon 1, Tamaulipas 2. Total of 3 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screw-worm flies released: Texas 168,000; Mexico 123,580,000. (Anim. Health Div.).

COMMON CATTLE GRUB (Hypoderma lineatum) - OKLAHOMA - Moderate in Mayes County cattle. Averaged 2 per head in cattle in Payne County. Adults active in Ottawa County on February 12. Grubs heavy in 60-70 percent of cattle slaughtered in packinghouse at Miami, Ottawa County. (Okla. Coop. Sur.).

MOSQUITOES - CALIFORNIA - Hibernating females again emerging after few days of cold weather. Annoyance high. Males appearing. Breeding may be early following wet winter. Much standing water indicates populations may be heavy this season. (Cal. Coop. Rpt.). MARYLAND - First instars of Aedes canadensis active throughout State. A. grossbecki larvae active in Prince Georges County. (U. Md., Ent. Dept.).

HOG LOUSE (Haematopinus suis) - MISSISSIPPI - Averaged 2.5 behind each ear on 30 hogs at State College, Oktibbeha County. (Pitre).

CHICKEN MITE (Dermanyssus gallinae) - MISSISSIPPI - Moderate on chickens at State College, Oktibbeha County. (Sartor, Feb. 13).

BROWN RECLUSE SPIDER (Loxosceles reclusa) - TENNESSEE - Specimen collected in Lawrence County. This is a new county record. (Ring). ALABAMA - Specimen collected inside home at Albertville, Marshall County. Determined by C.B. Williams. (McQueen).

HOUSEHOLDS AND STRUCTURES

POWDER-POST BEETLES (Lyctus spp.) - TENNESSEE - Damage severe to hardwood flooring in home in Davidson County. (Gordon).

STORED PRODUCTS

A DARKLING BEETLE (Palorus subdepressus) - WISCONSIN - Specimen collected in blacklight trap at warehouse in Milwaukee County by W.F. Simmons and R. Edmonds during second week of July 1969. Determined by T.J. Spilman. This is a new State record. (Wis. Ins. Sur.). Feeds on stored products. (PPD).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - SOUTH CAROLINA - Adults collected in housing development at Darlington, Darlington County, January 27, by S.W. Weaver. Determined by W.H. Owens; confirmed by D.R. Smith. This is a new county record. (PPD).

HAWAII INSECT REPORT

New State Records - Two specimens of an ARMORED SCALE (Melanaspis aliena) collected from Cymbidium at Hilo, Hawaii, on June 19, 1956, by Q.C. Chock. Determined by J.W. Beardsley. This species recorded from orchids, mostly Cattleya spp., in Florida, Cuba, Mexico, and Guatemala, and apparently is not a serious pest. (Kawamura). Specimens of TULIP BULB APHID (Dysaphis tulipae) collected on carrot leaves at Hilo, Hawaii, by B. Hu on March 4, 1965. Determined by L.M. Russell. Reported on Liliaceae and Iridaceae bulbs and shoots in northwest Soviet Union, central Asia, western and southwestern Europe, southwest Asia and Asia Minor, North Africa, and North and Central America. (Kawamura).

Corn - Nymphs and adults of CORN PLANTHOPPER (Peregrinus maidis) moderate on sweet corn in community garden at Kaumakani, Kauai. Nymphs of Tytthus mundulus (cane leafhopper egg sucker) light. (Sugawa).

General Vegetables - CARMINE SPIDER MITE (Tetranychus cinnabarinus) adults light (1-2 per leaf) on eggplant in small community garden at Puunene and in small planting at Waikapu, Maui. All stages medium in 0.75 acre of snap beans at Waianae, Oahu. (Miyahira, Funasaki). CHINESE ROSE BEETLE (Adoretus sinicus) foliar damage heavy (75 percent of leaf surface affected) in small planting of peanuts and moderate damage to older broccoli leaves at Puunene. (Miyahira). Nymphs and adults of CABBAGE APHID (Brevicoryne brassicae) light on broccoli flower heads in small community garden at Puunene. (Miyahira).

Nuts - All instars of BLACK CITRUS APHID (Toxoptera aurantii) light on flowers of Macadamia sp. at Kilauea, Kauai. (Sugawa).

Forest and Shade Trees - All instars of an ERIOCOCCID (Eriococcus araucariae) heavy in 3 acres of young Araucaria sp. at Kilauea, Kauai. (Sugawa).

DETECTION

New State Records - An ARMORED SCALE (Melanaspis aliena) HAWAII - Hawaii Island (p. 104). A DARKLING BEETLE (Palorus subdepressus) WISCONSIN - Milwaukee County (p. 103). A FLAT BARK BEETLE (Pediacus depressus) WISCONSIN - Milwaukee County (p. 103). SPRUCE APHID (Elatobium abietinum) NORTH CAROLINA - Buncombe County. This is the first record in the eastern United States. (p. 103). TULIP BULB APHID (Dysaphis tulipae) HAWAII - Hawaii Island (p. 104). A WHITEFLY (Aleyrodes spiraeoides) TEXAS - El Paso County (p. 102).

New County Records - BROWN RECLUSE SPIDER (Loxosceles reclusa) TENNESSEE - Lawrence (p. 103). IMPORTED FIRE ANT (Solenopsis saevissima richteri) SOUTH CAROLINA - Darlington (p. 104). SOUTHWESTERN CORN BORER (Diatraea grandiosella) ILLINOIS - Hamilton, Perry, White (p. 117). WESTERN CORN ROOTWORM (Diabrotica virgifera) WISCONSIN - Green (p. 119), Waushara, Winnebago (p. 101). YELLOW SUGARCANE APHID (Sipha flava) ARKANSAS - Washington (p. 121).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville, 2/13-19, BL - Armyworm (Pseudaletia unipuncta) 1, granulate cutworm (Feltia subterranea) 10.

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1969

(continued from page 94)

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

Highlights:

ARMYWORM outbreaks were serious in several Midwest and Plains States during 1969. ARMY CUTWORM was economic on crested wheatgrass in Idaho. Infested acreage in Nevada was about half that of 1968. This pest damaged sugarbeets, oats, and barley in North Dakota. BEET LEAFHOPPER damaged sugarbeets in some areas of California and Arizona and reduced yields in some fields in Idaho by 50-100 percent. CORN EARWORM damaged soybeans in Alabama and Virginia, and was the heaviest on corn, soybeans, and tomatoes since 1966 in Maryland. This pest was economic on soybeans in Arkansas. GREENBUG was heavy on sorghum for the second consecutive year in California, and controls were required in several areas of New Mexico. This pest was damaging in Kansas, but predators in some areas kept populations low. Predators held greenbug in check in most areas of Nebraska, but were not numerous enough in South Dakota. POTATO LEAFHOPPER damage declined in Maryland alfalfa, and is at a 25-year low in Michigan soybeans.

ARMYWORM (*Pseudaletia unipuncta*) outbreaks were serious in several Midwest and Plains States in 1969. Less serious infestations occurred in adjacent States. Infestations involved an estimated 3,656,000 acres of small grain, corn, pasture grasses, and some legumes. Approximately 1,113,000 infested acres were treated. The estimated loss to crops was in excess of $7 million.

Spring flights were heavier than usual in KANSAS. Larval buildups were heavy due to the wet spring and large amount of lodged wheat. The first outbreak occurred in Sumner and Cowley Counties in early June. Within 10 days, infestations were economic in the eastern two-thirds of the State. Damage was severe, particularly to downed wheat in the south-central, southeast, and central districts. Larvae caused much damage to bromegrass when they moved from maturing wheat in the east-central and northeast districts. About 450,000 acres of wheat and 120,000 acres of bromegrass were damaged. Controls were applied to an estimated 50,000 acres of wheat and 25,000 acres of bromegrass. Heavy populations damaged some isolated wheat in the western area in September. Blacklight trap catches were heavier than usual in central and western Kansas in the fall. Two complete broods and a partial third brood of armyworm developed in NEBRASKA. Larvae first appeared in late May and were active into early July. Infestations were spotty and concentrated in bromegrass where counts ranged 10-25 per square foot. Larvae ranged 1-6 per square foot in wheat, but most infestations were noneconomic. First-brood larvae were heaviest in the southeast and east crop districts. Activity declined about July 1. Populations were economic on about 120,000 acres. Second-brood larvae appeared about July 15 and damaged oats, corn, sorghum, and lawns. Damage was most serious in the central, north, east, and northeast districts, but a few infestations were reported in the southeast. About 85,000 acres were involved. Damage had ended by mid-August.

Armyworm threatened or infested an estimated 900,000 acres of barley, corn, flax, oats, and wheat in SOUTH DAKOTA. Some soybeans and alfalfa were involved also, but corn was the main host. Problems were reported in some counties west of the Missouri River. Larvae ranged up to 75 per square foot in swathed alfalfa in Walworth County. Counts declined in August. Populations are expected to be above normal in 1970. Crop loss was estimated at $2 million in South Dakota. Although there were no extensive armyworm outbreaks in NORTH DAKOTA, infestations were economc in the western area by late July. Up to 40 larvae per square foot appeared in oats, barley, wheat, and corn damaged by hail in early July in Dunn, Stark, Hettinger, and Golden Valley Counties. About 100,000 acres were infested and loss was estimated at $150,000. Populations in MINNESOTA were heaviest in

Rock, Nobles, Pipestone, and Murray Counties. Economic damage occurred to small grains, primarily oats, but corn, sorghum, reed canary grass, alfalfa, soybeans, and peas were damaged. Losses, including treatment costs, were estimated at about $1.5 million. Parasites and predators were very scarce.

Armyworm moths appeared in blacklight traps May 18 in Dane and Waushara Counties, WISCONSIN. A few large larvae were observed in Dane County July 4, and large numbers of moths began appearing in blacklight traps. Young larvae infested oats, alfalfa, and peas July 25. By August 8, corn, oats, and some peas had been treated in several counties. Up to 98 percent of oat heads and new seeding alfalfa was clipped by larvae in a few fields. Parasites were scarce in early August. Pupation was underway by August 15, and moth flights heavy by August 22. Moths were numerous until October 28 in Wisconsin. First armyworm moths were taken April 18 in southwest INDIANA, and flights were heavy July 5-11 in northern and southern districts. Moth flights reached a second peak in the southwest district August 16-22 and in the southwest, east-central, and northwest districts August 30 to September 5. First damage was noted in early August. Infestations were widespread but covered small, isolated areas. Corn was damaged in all districts, but only one field required controls. Second-generation damage ranged light to severe on grasses in the central, west-central, and northeast districts.

Moth catches in blacklight traps in northern ILLINOIS were almost too large to count. Larvae appeared in grassy corn by July 20 from Hancock County to McLean County to McHenry County. Counts of 25-40 per square foot were common. Populations were reduced by a virus, but 492,035 acres of corn required controls. Many lawns were heavily damaged. First armyworm larvae of the season in MISSOURI were observed April 16 in Cape Girardeau County. Infestations were light in dense wheat and barley during mid-May in the southeastern area. Larvae infested wheat in the central and northwest areas during June. Extensive controls on small grains were required only in the northwest area. Larvae ranged up to 40 per square foot in bromegrass pastures, and several pastures were stripped in Atchison, Nodaway, and Holt Counties. Moth flights were heavy in the northwest area in July. About 12,000 acres of pastures were treated in Atchison County.

Armyworm caused some concern in other areas. Damage was moderate to heavy on wheat in scattered counties in the western half of OKLAHOMA in late May and early June. Small outbreaks in WYOMING occurred in oats, barley, and corn in Goshen, Converse, and Crook Counties in late July and early August. Some oats were successfully treated in Goshen County. Damage was minor to lawns and gardens at Torrington, Goshen County, and Worland, Washakie County.

Spring armyworm moth collections in MICHIGAN light traps were 30 percent below normal for the past 2 to 3 years. In 1969, moth catches increased about mid-July, when it was too late to damage wheat and oats. Damage to field corn resulted from infested grasses in fields instead of from migration. Feeding in field corn was widespread, but damage was light. In 25 years, only one major armyworm outbreak has occurred east of U.S. Highway 27, which runs north and south through Lansing. Armyworm was generally very light throughout NEW JERSEY, and caused only minor damage in several Cumberland County barley fields. By early May, adults were very common in blacklight traps in DELAWARE. From late May through early June larvae infested scattered grain fields statewide. Populations in MARYLAND were well below normal on small grains and corn. Little acreage needed controls. Armyworm was generally lighter than last year in VIRGINIA, except in the southwest area where infestations on sod-planted corn were higher in Washington County. Most problem fields had been sod-planted following small grain. Mixed populations of Pseudaletia unipunctata and Spodoptera frugiperda (fall armyworm) were heavy in ALABAMA on several thousand acres of small grain from Montgomery south to the State line during September and October. Controls were required. Larvae infested Coastal Bermuda grass in Geneva County, August 12. Spotted areas required control in numerous counties north to Bibb County late in the season.

For special report on the armyworm situation in 1969 see CEIR 20(8):95-98.

ARMY CUTWORM (Chorizagrotis auxiliaris) destroyed 40 percent of the new barley plantings at Bancroft, Caribou County, IDAHO, during May. In early June this pest and WESTERN FIELD WIREWORM (Limonius infuscatus) reduced yields by 10 percent in a 70-acre alfalfa field at Bonners Ferry, Boundary County. Larvae ranged 4-8 per square foot in mid-April and destroyed most of a 7,500-acre Bureau of Land Management new seeding of crested wheatgrass and 4,500 acres of a two-year-old seeding in the Butte and Pothole Creek areas of Elmore County. In this same area, larvae also destroyed several hundred acres of flixweed, an important spring host of Circulifer tenellus (beet leafhopper). Economic populations on seed alfalfa in Humboldt County, NEVADA, required control. The infested acreage was about half that of 1968. No damage occurred in other counties. Damage to small grains was spotted and generally below normal in UTAH. Alfalfa was damaged in local areas in several counties. Army cutworm was light to moderate in northeast and east-central COLORADO. Larvae were first found in early March and peaked in mid-April with 0-4 per linear foot on wheat. Heavy populations were scattered. Controls were applied in isolated cases. Crop loss was light. Army cutworm was below levels of 1968 in WYOMING and caused little damage to wheat or alfalfa in 1969. Moths began appearing May 14 in Goshen County.

Scattered infestations in NORTH DAKOTA damaged oats and barley in Hettinger and Golden Valley Counties. Up to 6 larvae per square foot reduced stands as much as 50 percent in oats and barley. Over 3,000 acres of sugarbeets in Pembina County were reseeded or treated. Army cutworm populations were light in alfalfa in the central, south, southwest, and west districts of NEBRASKA. Damage was not economic on most alfalfa, but some scattered severe damage was noted on new seedings. Losses to new seedings were in Howard, Valley, and Perkins Counties. Damage declined by mid-May. Most controls were ineffective. Populations on wheat were less than in 1968. Populations were low but generally widespread throughout the southwest and panhandle areas. Populations on wheat in Nebraska in 1970 are expected to be about the same as in 1969. Populations in KANSAS were economic in only a few fields of small grains in the west-central and southwest districts, although blacklight catches in fall 1969 at Garden City and Hugoton were much higher than any time during the last 5 years. Development was about two weeks late. The first larvae were observed in late March. Army cutworm infested wheat and alfalfa from late January to mid-April in north-central, central, west-central, and south-central OKLAHOMA. Moderate populations were common but few heavy infestations were observed.

ASTER LEAFHOPPER (Macrosteles fascifrons) damaged wheat in south-central OKLAHOMA during late October and early November. Leafhoppers were detected in oats in Kenosha County, WISCONSIN, May 9. Counts increased from 1 per 100 sweeps to 30 per 100 sweeps in Dane County by May 16. Populations were higher in the eastern third of the State by July 4, with 120 per 100 sweeps of oats in Brown County. The percentage of leafhoppers carrying aster yellows was 3 times as great as in 1968, but populations were lower. Disease in lettuce and carrots was low due to preventive treatments. Adults were found as late as October 24. Damage by this economically important species was low due to control. Aster leafhopper was moderately heavy in MICHIGAN, but aster yellows was relatively light.

BEET LEAFHOPPER (Circulifer tenellus) damaged sugarbeets and required treatment in some areas of CALIFORNIA. Controls continued with regular spring, fall, and winter applications. Incidence of curly top remained generally low. There were some heavy infections in areas adjacent to breeding grounds. Beet leafhopper was heavy on sugarbeets in Cochise County, ARIZONA, in April and June. Some fields were treated. Numbers were heavy on sugarbeets in Maricopa and Pinal Counties during May, and unusually heavy populations infested most alfalfa in the Salt River Valley, Maricopa County. This leafhopper was generally low on sugarbeets in central and northern UTAH.

Overwintered beet leafhopper adults in WYOMING declined to 1.1 per 10 square feet in wasteland areas in the Worland Valley of Washakie and Big Horn Counties in April. About 6,912 acres of wasteland were treated. Counts after spraying indicated 0.1 adult per 10 square feet. Curly-top disease was first detected in Washakie County July 29. Beet leafhopper adults from 9 combined range breeding areas in southern IDAHO averaged 60 per 100 1-square-foot samples in April compared to 42 in 1968. About 45,000 acres needed control to prevent excessive migrations into croplands. The percentage of viruliferous leafhoppers often exceeded 20 percent, 4 to 6 times greater than in the past 2 years. Numbers were more abundant on sugarbeets and beans in the southern area than in previous years. Yields in many fields were reduced 50-100 percent.

CORN EARWORM (Heliothis zea) infested a variety of crops at Belle Glade, Palm Beach County, FLORIDA. Larvae were abundant in late spring and early summer and damaged 91 percent of sweet corn ears on unsprayed plots. Damage was less severe than in previous years on sweet corn in the muck soil growing area at Zellwood, Orange County. Larvae were light on pigeonpea at Gainesville, Alachua County, during July and heavy on 40+ acres of peas during August. Young blooms and pods were damaged. Corn earworm was one of the major pests of soybeans in southern ALABAMA with lesser damage in central and northern areas. Following a heavy buildup on cotton and other crops, larvae infested peanuts in Geneva and Pike Counties the first week of August. H. zea occurred in mixed populations with other leaf feeders throughout the southeastern peanut area. Control of these soybean pests required 2-4 applications of insecticides to 60 percent of the total State acreage. Larvae were widespread and damaged pretassel corn and sorghum and ear corn in milk and dough stages. First-generation larvae occurred in March and April on crimson clover, vetch, and other winter legumes. Larvae were heavy on some varieties of late-planted soybeans in west TENNESSEE during September. Pod damage was 25-50 percent in some instances. Damage by H. zea to soybeans does not appear to have affected the statewide yield. In most instances control was effective. In WEST VIRGINIA, corn earworm caused light damage to field corn, primarily to tassels. Larvae averaged 2 per plant in 10 percent of the plants in Hampshire and Hardy Counties. Sweet corn was damaged in late July and August, and larvae averaged 2 per ear on a small percentage of plants in Logan and Boone Counties. Larvae caused severe economic damage to soybeans during September in the Tidewater section, Northern Neck, and on the Eastern Shore of VIRGINIA. Some fields were almost completely destroyed by buildups in nearby corn. This infestation was considered to be the worst in years. It was not uncommon to find 50 percent of the pods empty. Loss at Holland, Nansemond County, averaged 20 percent in treated plots and 28 percent in untreated plots. H. zea larvae severely defoliated many peanut fields in Southampton, Isle of Wight, Sussex, Surry, and Nansemond Counties. Some growers failed to get satisfactory control, probably due to improper timing of application.

Corn earworm infestations in MARYLAND were the heaviest since 1966 on corn, soybeans, and tomatoes and three times heavier than 1968. Larvae first infested corn June 20 and by early August infestations averaged 70 percent in Kent, Queen Annes, Caroline, and Wicomico Counties, and 50 percent in Prince Georges, Charles, and St. Marys Counties. Damage peaked and ranged 80-100 percent by mid-August in southern Maryland and on the Eastern Shore. In Frederick, Howard, Baltimore, Harford, and Montgomery Counties, damage to corn peaked in late August and ranged 10-80 percent. Late-season carryover to soybeans and tomatoes was heavy. Damage to young soybean pods ranged 5-20 percent in Queen Annes, Talbot, Dorchester, and Worcester Counties. About 7,000 acres of soybeans needed controls. Crops left in the fields in Dorchester and Wicomico Counties were heavily infested after controls had been discontinued. Larvae caused economic losses in two extensive plantings of greenhouse chrysanthemums in Prince Georges and Carroll Counties. Corn earworm moths were first found in Sussex County, DELAWARE, during mid-May. Flights continued to increase with very heavy counts noted from early August through mid-September. Infestations in corn started in late June and continued to be a serious problem. Larvae averaged 10 per row foot on late planted soybeans in Sussex County in September. Larvae were heavy on late-planted lima beans during late August and September. The first blacklight collection was made in late May in central NEW JERSEY, and by mid-July, moths were abundant. Overwintering survival was higher than normal also in the Atlantic States just to the south. Heavy populations were present throughout August and early September, and declined with cool nights in late September. Moth catches peaked September 5-7 in the Seabrook area, Cumberland County, when slightly over 200 were collected each night. Generally, populations were the heaviest that many farmers remembered over the last 25 years. Crop damage was minimal due to grower awareness of the potential problem. Damage was light to moderate on sweet corn, lettuce, and lima beans. Numbers were average in CONNECTICUT on forage and sweet corn. Some RHODE ISLAND potato fields were 100 percent infested in Washington and Providence Counties on August 18.

An early corn earworm outbreak occurred in a sweet corn test plot July 28 in Monroe County, MICHIGAN. Females were active from June to July. Field problems were below normal. H. zea adults were first caught in blacklight traps in Rock County, WISCONSIN, July 25. Counts remained light in Rock County until August 22 when light catches occurred in Grant, Dane, Washington, and Columbia Counties. Significant moth catches of 5 or more in 3 nights occurred at many sites in the southern third of Wisconsin by August 29. Treatments in sweet corn began immediately. Up to 10 percent of sweet corn ears were infested. Although moths appeared somewhat earlier in blacklight traps in INDIANA and in comparable numbers, larvae occurred infrequently in dent corn ears. Corn earworm was not a serious problem in INDIANA. Numbers were fewer than usual, but this pest was present in sweet corn in the northern districts and in green beans in the central section. In IOWA, corn earworm infested 0.29 percent of the corn ears compared to 8.4 percent in 1968.

Corn earworm was economic on sorghum in Chicot County, ARKANSAS, probably due to lack of predator control. Infestations were economic on soybeans in late August and early September. Populations were the heaviest since 1964. A count of 428 larvae in 30 row feet in late August in Desha County set a new high. About 1,723,200 acres or 40 percent of the crop required treatment. Due to high numbers and difficulty of control, 10 percent of the treated acreage required a second application. Control cost and yield loss amounted to $5,887,400 with control cost being the major factor. Larvae damaged alfalfa, corn, sorghum, peanuts, broomcorn, and pigeonpeas from late May through October in OKLAHOMA. Counts were heavy, mostly in corn and sorghum in the south-central area in July and August, and heavy on peanuts only in the south-central area in late August. Corn earworm was light on corn throughout the summer in KANSAS. Some north-central and northwestern areas had moderate to high populations. Larvae were light, averaged less than one per head on sorghum in eastern areas. A few soybean fields had moderate to heavy counts and heavy damage was noted in Cherokee County in mid-September. Some loss was as high as 50 percent. Populations were low on corn in NEBRASKA in 1969. Well below 1 percent of the crop was infested. Numbers were far below levels of 1968.

Corn earworm was one of two pests of lettuce in NEW MEXICO requiring treatment throughout the growing season. Some chilli pepper fields required controls to keep small larvae from entering pods. This pest was light to moderate on corn in UTAH. Infestations were generally light on sweet corn, being heaviest in the southern area. Larvae were abundant in southwestern IDAHO when early planted sweet corn began to tassel. H. zea infested 90 percent of the ears in numerous cornfields. Significant losses were evident at harvest. The severe winter reduced overwintering pupae in Yakima County, WASHINGTON. Larvae fed at the stem ends of ripening peaches in an orchard near Medford, Jackson County, OREGON. Corn earworm ranged light to heavy over CALIFORNIA on potatoes, tomatoes, and peppers, and caused local damage to field and lima beans in several locations.

TOBACCO BUDWORM (Heliothis virescens) caused heavy losses to flue-cured tobacco and was the primary pest of cigar-wrapper tobacco in FLORIDA in 1969. Infestations were heavier than in 1968. Damage ranged heavy to severe in 1969 and occurred mostly late in the season. Larvae were very heavy on several acres of pigeonpeas at Gainesville, Alachua County, during July. Counts decreased slightly in August. Mixed populations of tobacco budworm and CORN EARWORM (H. zea) were the most serious pests of tobacco in ALABAMA. Controls kept damage low. Tobacco budworm caused varying degrees of damage to tobacco in several areas of TENNESSEE during July. Tobacco budworm infested sweet corn for the first time in ARKANSAS. Populations on soybeans, although light, were heavier than for several years. Prior to 1969, only 2 of 1,700+ Heliothis larvae collected on this host were H. virescens. In 1969, 474 H. zea and 10 H. virescens were collected from soybeans.

CORN LEAF APHID (Rhopalosiphum maidis) was lighter than usual in CONNECTICUT. Counts were generally light in NEW JERSEY and not so troublesome as in recent years except in several Camden County fields. Numbers were very light on corn in VIRGINIA, and caused no economic damage. Corn leaf aphid was far below 1968 levels in MARYLAND. The only buildup occurred in Frederick, Howard, Baltimore, Prince Georges, and St. Marys Counties where infestations ranged light to moderate on 10-70 percent of the corn. Counts were heaviest in Frederick County. The first colony on corn in OHIO was a small infestation in Seneca County June 25. The first heavy infestation was reported July 20 in Union County. Counts were not abundant until the end of August. Colonies were widespread in southeastern Ohio the last week of August and in northeastern area the first week of September. Populations were light throughout MICHIGAN. Colonies were quickly arrested by Empusa fungus.

Small colonies of corn leaf aphid were noted in 75 percent of corn whorls in Rock County, WISCONSIN, June 11. Increase was slight in June and July due in part to Orius insidiosus (a flower bug). R. maidis infested 90 percent of the corn in southwestern counties by August 1, but only 5 percent had colonies of 500+ aphids. Counts were high in a few late-planted fields in Adams, Monroe, Jackson, Trempealeau, Buffalo, Portage, Waupaca, and Waushara Counties. About 7,500 acres were treated. In ILLINOIS, R. maidis was almost conspicuous by its absence compared to the severe infestations of 1968. Populations in INDIANA were light on 23 percent of corn, moderate on 4.65 percent, and heavy on 0.07 percent by October 1. Populations were lighter than in 1968 and slower in building up. Damage was very light.

Corn leaf aphid was heavy throughout ALABAMA, especially in the northern area. Maize dwarf mosaic again appeared quite general throughout the northern area. Corn leaf aphid is suspected as the vector. This aphid caused some damage to small grains in 1969 in Trans-Pecos and central areas of TEXAS. Infestations were light on grain sorghum during late May in central Texas, observed on Johnson grass in the Rolling Plains in early June, and heavy in many South Plains counties in late June. Controls were applied in late June. In early August, numerous light infestations were reported in the High Plains. Corn leaf aphid infested wheat only in southwestern OKLAHOMA in mid-April. Sorghum was infested from late May through September. Infestations were moderate to heavy in west-central, southwest and south-central areas during June and in isolated areas in northwest and northeast counties. Populations were heavy in the panhandle area in July and early August. Corn leaf aphid was normal in KANSAS throughout spring and summer and caused little, if any, damage to corn and sorghum. In October and November light to moderate numbers infested wheat. This pest caused no problems in NEBRASKA. Colonies began developing on sorghum in mid-June, peaked in mid to late July, but did no noticeable damage. Infestations were light on corn early in July, built to a peak by mid-July, then declined as predators increased and corn began to tassel. Infestations were noticeable through mid-August, but little or no damage was recorded. In SOUTH DAKOTA, corn leaf aphid was heavy but noneconomic on sorghum in Hand and Walworth Counties in late July. Lady beetles and snakeflies effected control. In early October, numbers were low (one winged female per 2 row feet) on winter wheat in Stanley and Haakon Counties.

Colonies of *Rhopalosiphum maidis* were first observed in cornfields in Park County, WYOMING, July 31. Populations up to 2,000 per corn plant infested 20-30 percent of the plants during the first week in August in Goshen, Platte, and Laramie Counties. Predators and parasites kept this pest under control. Infestations were generally scattered throughout IDAHO. Two severe infestations were noted during early August on spring grain at Moore, Butte County, and in the Pahsimeroi River Valley. Numerous lady beetles and syrphid flies materially reduced these infestations. *R. maidis* was economic on barley and wheat in eastern Idaho. Barley was still in the milk to dough stages at Aberdeen, Bingham County. Economic levels were general in mid to late July. Control was justified in many fields. Corn leaf aphid caused some serious damage to barley in parts of Millard, Cache, Beaver, Sanpete, and Weber Counties, UTAH. Infestations were local elsewhere in the State, and occasionally severe on sweet corn. Infestations were heavy on barley and wheat in Clark County, NEVADA, in April. Populations were reduced below economic levels by predators. Most controls were required in Churchill, Lyon, and Pershing Counties in June and July. Little or no treatment was made in other counties. Corn leaf aphid was not so prevalent in CALIFORNIA in 1969 as in 1968.

GREENBUG (*Schizaphis graminum*) was heavy on sorghum in CALIFORNIA for the second consecutive year. However, growers were able to control infestations this season. For the first time it was a general pest on barley in California. Greenbug was generally light and spotty on small grains in Clark County, NEVADA, in early April. Predators reduced these infestations to low levels by May. In ARIZONA, greenbug caused no heavy damage to sorghum, barley, or wheat. A few late plantings required controls. Infestations were light in most sorghum fields throughout the State from March through August, but no buildups occurred. Greenbug infested sorghum in Washington County, UTAH, but was not severe. Populations were not so heavy and widespread in COLORADO as in 1968. This pest first appeared in the Arkansas Valley during the last half of June, and peaked the last of July. Greenbug ranged 0-2,000 per sorghum leaf. Infestations spread into Kit Carson, Yuma, and Cheyenne Counties where controls were applied. Populations were found throughout eastern Colorado. Heavy populations were scattered where controls were applied. Damage was light to moderate with overall loss light. Greenbug was found on the Western Slope at Grand Junction. Greenbug and CORN LEAF APHID (*Rhopalosiphum maidis*) began to buildup in July in southeastern NEW MEXICO. About 80,000 acres of grain sorghum and 10,000 acres of broomcorn were treated in Curry and Roosevelt Counties. Many infestations in sorghum in Luna and Hidalgo Counties required treatment. Spring buildups in small grain caused losses in untreated fields in eastern counties. About 18,000 acres of wheat were treated and losses averaged 1,500 to 2,000 pounds per acre due to greenbug and hot weather in Lea County. About 10,000 to 15,000 acres were treated in Roosevelt County. Almost every field of wheat in Curry County was treated at least once with many requiring additional treatment.

Greenbug remained light on small grains throughout much of TEXAS in January and February with the exception of some Rolling Plains counties. Spotted and heavy infestations were reported during mid-February from many counties in the Rolling Plains, High Plains, and central areas. Controls were applied in many of these areas. Spotted, moderate to heavy infestations were reported from south and central areas, the Rolling Plains, and in the panhandle during late February and early March. Infestations decreased in some Rolling Plains counties and remained unchanged until mid-March when increases occurred in the Rolling Plains and High Plains. Some damage to small grains was reported during April in the Rolling Plains. Activity was light on emerging small grains in Donley and Collingsworth Counties in early October and moderate to heavy in the Rolling Plains in December. Greenbug was detected on Johnson grass as early as April 18 in Deaf Smith County, Texas. In early June light numbers were scattered on grain sorghum in the Rolling Plains. Light populations were detected for first time in the Trans-Pecos region on grain sorghum in mid-June. Infestations ranged light to medium in Glasscock, Midland, and Martin Counties in the Trans-Pecos area as well as Dimmit and Zavala Counties in the lower Rio Grande Valley. Greenbug began to build up in the Blacklands and central Texas about mid-June. The aphid was light in many fields in the South Plains area in late June and in some areas in the High Plains. Infestations increased on grain sorghum in the Rolling Plains, South

Plains, Trans-Pecos, and High Plains regions from mid-July through August, and declined in most of these areas in late August due to increased parasite and predator populations. Greenbug first appeared in damaging numbers in southwest OKLAHOMA in early February, and was moderate to heavy over the southwest quarter of the State through mid-April. Parasites and wheat maturity eliminated most infestations late in the month. First infestations were noted in sorghum in late May in west-central and northwest counties. Counts were heavy in the northeast area during early June, the southwest area in late June, and the panhandle and western counties from mid-July through mid-August. These infestations continued through September. Counts were heavy in Jackson and Harmon Counties by mid-November and moderate to heavy by early December in scattered areas over the southwest quarter of the State. By the end of December colder weather had caused a decline in most areas.

Greenbug was light on wheat in north-central and southeast KANSAS in early March. By mid-May greenbugs moved to some early sorghum, often within two days after germination. Damage was severe in some fields in the southeast, south-central, and north-central areas. About 250,000 acres were treated in these areas and repeated in many fields. Sorghum in all other areas was not economically infested. Within three weeks, counts had declined sharply due to predators, heavy rains, high temperatures accompanied by winds, and other factors. During the summer an additional 325,000 acres were treated. Predators, and in some cases parasites, effectively kept populations low. Greenbug was not economic on corn in the southwest area. Very light numbers were found throughout fall 1969 on wheat in all areas of Kansas except the southwest district.

Greenbug occurred in trace numbers on wheat in east and southeast NEBRASKA April 22-23. Very light catches in suction traps at Lincoln, Lancaster County, indicate light northward migration April 1-7. The pest remained very low in wheat, averaged up to 8 per 20 sweeps, in east and southeast districts, with no damage. First injury to seedling sorghum was noted June 2 in Jefferson County where 75-80 percent of the plants in 9 fields were infested. Scattered damage with some replanting and treatment, occurred in the east, southeast, and south districts of Nebraska, but was not so serious as in 1968. Predators increased much earlier and reduced greenbug numbers in the southeast by July 1. First damage was noted in late July and controls were applied in scattered areas of the south, southwest, central, and southeast districts. A peak of 700-800 greenbugs per lower leaf was reached about August 15. Predators drastically reduced the population by August 22. Greenbug caused no serious problem on winter wheat in spring or on new seedings in the fall in Nebraska. Slight buildup was noted in winter wheat in late September in the east district, but did not develop to economic levels. It damaged a rye seeding 30 percent in Washington County on September 26. Greenbug remained below economic levels on wheat in WYOMING. In SOUTH DAKOTA, greenbug averaged 100 per plant on grain sorghum 3.5 feet high in Bon Homme and Charles Mix Counties in early August. By the middle of the month, the first 4-6 leaves on the plants were dead. In heavily infested fields, counts ranged up to 2,000 (averaged 200) per leaf. Infestations were found in Gregory, Tripp, Davison, Clay, and Brookings Counties also. Greenbug also infested 8-foot silage sorghum south of Geddes, Charles Mix County. Predators were not numerous enough to check populations. Infestations on sorghum in 1969 were more intense and more widespread than in 1968. Economic numbers infested about 120,000 acres of sorghum, of which 50,000 acres were treated. Infestations built up rapidly during head development. Yields were reduced in untreated acres. Although winter wheat had stooled well, leaves were shorter than at a comparable time in 1968. Cold weather and snow came earlier in the fall than in 1968 in winter wheat areas. These and other factors may have kept greenbug populations below levels necessary for progressive buildup in the fall. Only one field had economic numbers--in northwestern Beadle County in late October.

Greenbug populations were light on small grains through the 1969 season in MINNESOTA. Alates were in oats at Spring Green, Sauk County, WISCONSIN, May 23. A few alates were in oats in Adams County June 13. Greenbug was very scarce in all areas, and colonies were not detected in the State. In MISSOURI, greenbug infested seedling sorghum in Barton and Jasper Counties during June. Counts ranged from 5 to over 50 per plant. This was the only area that needed controls. Greenbug counts per 100 sweeps of small grains in northwestern ARKANSAS ranged 10-15 in late February, 20-25 in early March, and 200-300 in mid-April when one-third of the aphids were parasitized. Greenbug was occasionally found on sorghum in Washington County. Infestations were not economic. Greenbug infested small grain fields throughout ALABAMA, but no damaging infestations were reported. In MARYLAND, greenbug was heavy and seriously injured several hundred acres of bluegrass turf seedlings on turf farms in Prince Georges and Queen Annes Counties.

MELONWORM (Diaphania hyalinata) was the most serious pest of cucumbers, cantaloups and pumpkins in ALABAMA during the 1969 season.

POTATO PSYLLID (Paratrioza cockerelli) adults began appearing on Lycium sp. May 15 in Goshen County, WYOMING. Timely control applications early in the season resulted in little damage to potatoes from psyllid yellows in Goshen and Laramie Counties. Populations were heavy on tomatoes and potatoes in eastern COLORADO. Adults appeared in mid-May and peaked by mid-June in the northeastern area. Counts ranged 0-4 per 100 sweeps in most fields, but up to 30 in more heavily infested fields. Potato psyllid ranged 0-35 per 100 sweeps and peaked by the end of July in the Arkansas Valley. Damage was light and losses light to moderate. Potato psyllid populations were generally lower than usual and damage was light on potatoes in UTAH.

POTATO LEAFHOPPER (Empoasca fabae) ranged light to moderate on beans and potatoes in NEW JERSEY, but no damage was noted. Damage to alfalfa has continued to decrease over the past 3 years throughout MARYLAND. Part of the decline has been due to timely controls and cuttings. In 1969, potato leafhopper first appeared in Frederick County about July 4 at 3-5 per sweep. Counts peaked about July 18 with highest counts of 32-75 per sweep in Frederick, Baltimore, Harford, and Montgomery Counties. Populations decreased and phased out about August 29 at 0-3 per sweep. There was no damage to other crops. Light to moderate "hopperburn" on alfalfa was limited to Washington, Baltimore, Frederick, Montgomery, Howard, and Harford Counties. This leafhopper caused little or no damage to forage crops in VIRGINIA.

Potato leafhopper is normally a serious problem on second and third cuttings of alfalfa in OHIO, but it caused very little damage in 1969. Adults averaged 10-15 per 10 sweeps statewide, but fields were seldom yellowed. In INDIANA, this leafhopper infested most alfalfa fields sampled. Counts averaged 35 (ranged 0-192) per 10 sweeps throughout the season. Potato leafhopper was not important in ILLINOIS, although it occurred statewide during the season. The pest appeared later than usual in MINNESOTA, and no problems were reported on alfalfa. E. fabae adults were first observed in alfalfa in southern WISCONSIN June 13. Counts averaged 3 per 10 sweeps in alfalfa statewide June 20, and in potatoes in gardens June 27. Populations increased late in July when adults and nymphs averaged 1 per sweep. Counts averaged 3-5 per sweep in alfalfa in southwestern counties by September 12. About 24,000 acres were treated for this pest in Wisconsin. Potato leafhopper infestations reached a possible 25-year low on soybeans in MICHIGAN in 1969.

SPOTTED ALFALFA APHID (Therioaphis maculata) infestations were medium on common varieties of alfalfa in Clark County, NEVADA, in early April. Parasites and predators reduced these infestations to low levels (0-2 per sweep) by late April. This aphid was generally light in UTAH, but an outbreak did develop on several hundred acres of alfalfa in an area of Millard County. There were no areas of general infestations in NEW MEXICO, but an occasional economic infestation of spotted alfalfa aphid was found in the Pecos and Mesilla Valleys which required treatment. Spotted alfalfa aphid ranged up to 2,500 per 100 sweeps of alfalfa in late August and early September in the Arkansas Valley of COLORADO. Damage was light to moderate and overall loss light. No economic infestations were found in WYOMING. This aphid was found for the first time in Campbell, Converse, Crook, Niobrara, and Weston Counties in 1969.

Spotted alfalfa aphid averaged 8 per 100 sweeps in a year-old alfalfa stand east of Spearfish, Lawrence County, SOUTH DAKOTA, the third week of May. Alfalfa was 6 to 8 inches high. Counts had increased to 100 per 100 sweeps west of Spearfish 7 days later. Infestations of this aphid were very light throughout the east, northeast, southeast, and central districts of NEBRASKA early in the season, but caused no appreciable damage. One new alfalfa seeding observed August 22 in Dawson County showed some damage. Aphids averaged 92 per 10 sweeps. Populations in KANSAS remained low throughout summer and fall. Infestations were light on alfalfa in most areas of OKLAHOMA. Heavier counts occurred in a few south-central and southwest counties in April and late June, and in scattered areas in September. Spotted alfalfa aphid caused some problems on forage legumes in TEXAS. Spotted alfalfa aphid was light in ARKANSAS in 1969. Surveys were negative in most areas during spring and summer. Populations built up to 1,000-1,500 per 100 sweeps in the northwest area in early October following extended dry weather but immediately fell to zero following heavy rains. Trace numbers on alfalfa were first observed in Harrison County, INDIANA, in late April. Numbers remained at trace levels. Spotted alfalfa aphid was very light on forage crops and caused very little damage in VIRGINIA.

TOBACCO HORNWORM (Manduca sexta) caused light damage to flue-cured tobacco in FLORIDA late in the 1969 season. A slight increase in populations was noted in the vicinity of cigar-wrapper tobacco fields. Moth collections in light traps were 29 percent greater than in 1968. However, no damage was reported to cigar tobacco in Florida. In RHODE ISLAND, tobacco hornworm infestations ranged moderate to heavy on tomatoes about August 1 in Washington and Providence Counties.

TOMATO HORNWORM (Manduca quadrimaculata) was light in most tomato and pepper fields in NEW JERSEY. Many parasitized larvae were observed in Gloucester County in mid-August. Tomato hornworm damaged potato foliage in several areas of UTAH, including Emery, Grand, and Salt Lake Counties. Infestations of this pest were virtually absent from potato plantings in southwest IDAHO. No larvae were found in tomato fields by August 1, during the period peak numbers were recorded in previous years.

CORN, SORGHUM, SUGARCANE

Highlights:

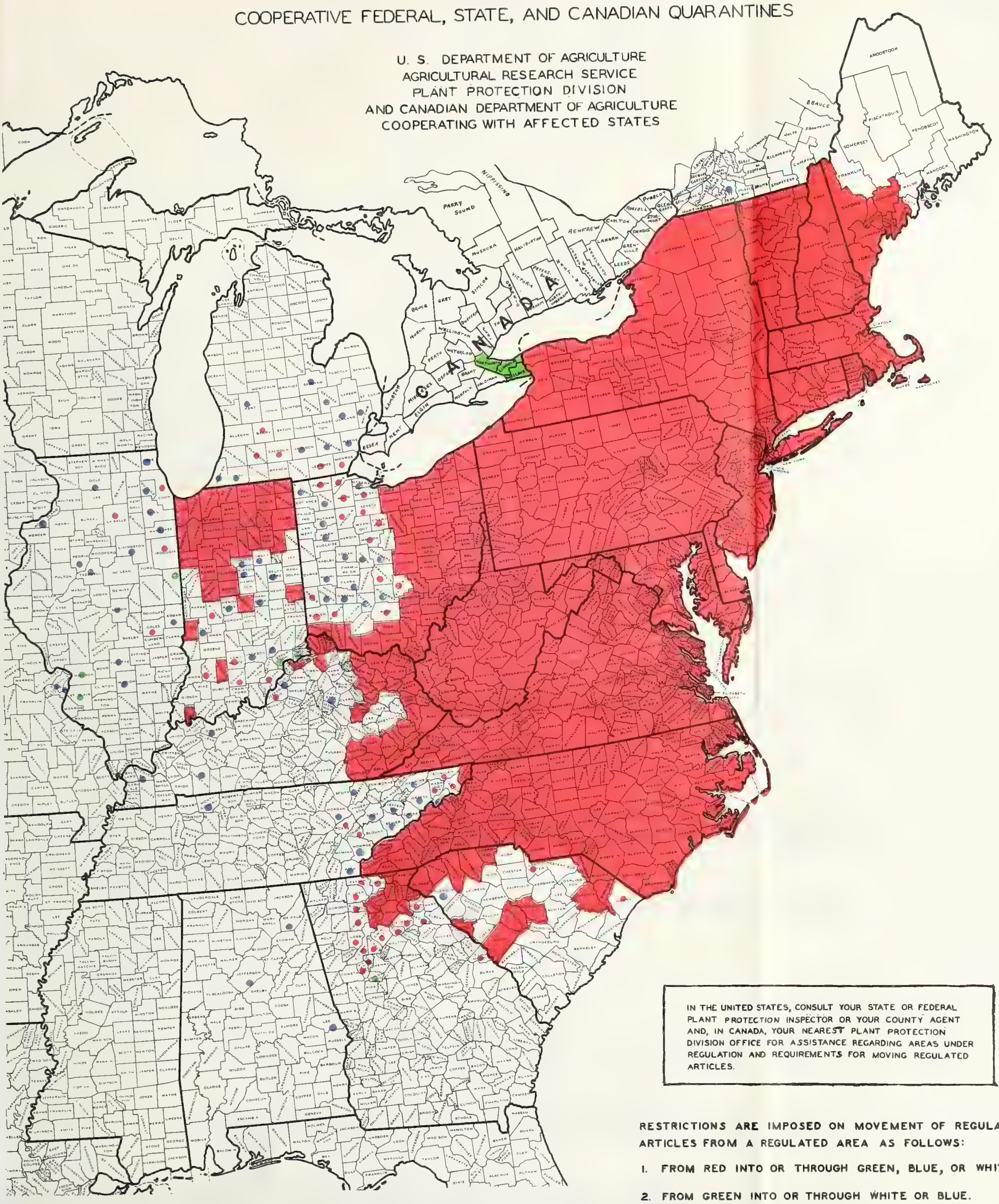
EUROPEAN CORN BORER increased in several corn-producing States. Decreases were recorded in Illinois, Indiana, Ohio, Iowa, and Maryland. Overwintering populations in Missouri were the lightest since 1966 and highest on record in the southwest and west-central districts. FALL ARMYWORM damaged broomcorn and sorghum in New Mexico, was heavy on corn and sorghum in Oklahoma, and was heavy in areas of Texas and throughout Missouri. CORN ROOTWORMS were of concern in several States. These pests are expected to increase in areas of Minnesota, South Dakota, and Nebraska in 1970. YELLOW SUGARCANE APHID caused some severe damage to sorghum in Texas, was heavy on corn and sorghum in Oklahoma, and reported for the first time from Arkansas.

EUROPEAN CORN BORER (Ostrinia nubilalis) continued a problem to corn growers throughout its range. Up to 1 larva per stalk infested 0-6 percent of the corn at Roggen and Prospect in Weld County, COLORADO. In the Kiowa Valley, the center of infestation in the State, up to 1 larva per stalk infested 20-50 percent of the treated corn. Larvae ranged 1-3 per stalk in 18-76 percent of untreated corn in the valley. Larval numbers peaked the first week in August. In KANSAS the first generation of European corn borer was heavier than normal in many northeastern

JAPANESE BEETLE

COOPERATIVE FEDERAL, STATE, AND CANADIAN QUARANTINES

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PROTECTION DIVISION
AND CANADIAN DEPARTMENT OF AGRICULTURE
COOPERATING WITH AFFECTED STATES



IN THE UNITED STATES, CONSULT YOUR STATE OR FEDERAL PLANT PROTECTION INSPECTOR OR YOUR COUNTY AGENT AND, IN CANADA, YOUR NEAREST PLANT PROTECTION DIVISION OFFICE FOR ASSISTANCE REGARDING AREAS UNDER REGULATION AND REQUIREMENTS FOR MOVING REGULATED ARTICLES.

RESTRICTIONS ARE IMPOSED ON MOVEMENT OF REGULATED ARTICLES FROM A REGULATED AREA AS FOLLOWS:

1. FROM RED INTO OR THROUGH GREEN, BLUE, OR WHITE.
2. FROM GREEN INTO OR THROUGH WHITE OR BLUE.
3. GREEN INTO GREEN.
4. WITHIN GREEN.*
5. FROM BLUE INTO ANY OTHER AREA.**

*IF REQUIRED BY AN AUTHORIZED INSPECTOR.

**IF REQUIRED BY APPROPRIATE STATE QUARANTINE OR BY AN AUTHORIZED INSPECTOR.

COUNTIES ENTIRELY COLORED ARE COMPLETELY REGULATED; COUNTIES WITH COLORED DOT ARE PARTIALLY REGULATED.

🟥	GENERALLY INFESTED AREA - STATE AND FEDERAL REGULATIONS. (ERADICATION TREATMENTS NOT IN PROGRESS OR PLANNED)
🟩	SUPPRESSIVE AREA - STATE, FEDERAL, AND CANADIAN REGULATIONS. (SUPPRESSIVE TREATMENTS IN PROGRESS OR PLANNED)
🟦	STATE AND CANADIAN REGULATIONS. (SUPPRESSIVE TREATMENTS IN PROGRESS OR PLANNED)

SEE REVERSE SIDE FOR REQUIREMENTS CONCERNING CERTIFICATION OF REGULATED ARTICLES.

REVISED JANUARY 15, 1970

THE FOLLOWING CROPS OR ARTICLES MUST BE MOVED UNDER CERTIFICATE OR PERMIT YEAR-ROUND EXCEPT AS INDICATED:

1. Soil, compost, decomposed manure, humus, muck, and peat, separately or with other things.

   Soil samples of any size shipped to U.S. Army Corps of Engineers Soil Laboratories within the conterminous U.S. are exempt. Soil samples of one pound or less are exempt if shipped to a designated laboratory.*

   Compost, decomposed manure, humus, and peat are exempt** if dehydrated, ground, pulverized, or compressed.

2. Plants with roots, except soil-free aquatic plants, moss, and Lycopodium (clubmoss or ground-pine or running pine).

3. Grass sod.

4. Plant crowns and roots for propagation.

5. True bulbs, corms, rhizomes, and tubers of ornamental plants when freshly harvested or uncured.

   True bulbs, corms, rhizomes, and tubers (other than clumps of dahlia tubers) of ornamental plants are exempt** if free of soil.

6. Used mechanized soil-moving equipment.

   Used mechanized soil-moving equipment is exempt** if cleaned and repainted.

*Information as to designated laboratories may be obtained from an inspector.

**Exempt if not exposed to infestation after cleaning or other prescribed handling.

GPO 816-C92

areas, with more than the usual number of broken stalks. Fall population counts were higher than in the last 10 years. Up to 12 larvae per stalk completely infested many fields in the Kansas River Valley. Many stalks were broken, but much of this breakage was due to rot. Larval infestation ranged up to 30 percent in many sorghum fields in southeast and east-central Kansas, with many broken stalks in some fields.

European corn borer winter survival in Cuming and Hall Counties, NEBRASKA, was above the 15-year average and higher than in 1968. Borers per acre averaged 2,407 in Cuming County and 1,799 in Hall County. Infestations ranged 25-75 (averaged 54) percent in several Dixon County cornfields July 17. Most first-generation damage was confined to the southeast district. First-generation larvae averaged 38.7 per 100 plants in 47.2 percent of the corn in Cuming County and 2.25 per 100 plants in 8.1 percent of the corn in Hall County. This compared to second-generation infestations of 465.7 larvae per 100 plants on 97.7 percent of the corn in Cuming County and 111.6 larvae per 100 plants in 74.4 percent of the corn in Hall County. The fall population in Cuming County was the highest and that in Hall County the fifth lowest compared to the 15-year average for these counties. The 1969 fall populations were about double those of 1968. The largest increases occurred in the northeast and east districts. European corn borer infested about 2 percent of sorghum heads in a few fields in the southeast quarter of Nebraska, but damage was negligible. Winter survival in SOUTH DAKOTA ranged 30-100 percent in 9 southeastern counties from mid-April to mid-May. Survival was lowest in Bon Homme County. Although winter survival was lower than in the past 2 years, larvae increased during the season. Since very few fields were treated, damage was higher than in recent years. The overwintering population in 35 eastern counties in fall 1969 was the highest in several years. Winter survival in NORTH DAKOTA was 86 percent, a 5-percent increase over 1968. During fall, larvae averaged 177 per 100 plants in Cass, Richland, Ransom, Sargent, and Dickey Counties, a 58-percent increase over last year.

European corn borer fall populations increased in 7 districts of MINNESOTA. Increases ranged from 5 percent in the south-central to a high of 217 percent in the southwest district. The average percent of increase for the State was 64 percent. Stalk breakage ranged 2-10 percent. The outlook for 1970 is for higher populations and damage in the southwest, west-central, and northwest districts. In IOWA weather did not favor the first generation, but conditions were favorable for the second generation. The highest populations in the fall were in the western and southern areas. Trends were the same as in 1968. The first and second generations of European corn borer were economic in corn in all areas of MISSOURI. The 1969 overwintering populations are the highest since 1966, and the highest on record in the southwest and west-central districts. Overwintering larvae averaged 4,659 per acre in ARKANSAS, a 90-percent increase compared to 1968 fall infestations.

European corn borer infested corn throughout ALABAMA. Infestations were lower than for the period 1960-1966, but about the same as in 1968. Isolated populations damaged late corn as far south as Autauga County in 1969. In central TENNESSEE, larvae damaged sweet corn the week ending June 20, with 40-50 percent of the plants infested in the area by June 27.

Winter survival in ILLINOIS was higher than normal, ranging 80-90 percent in late March and early April. Severe storms killed many moths, and egg laying, which had just begun, ceased almost completely. The first generation numbered 11 per 100 stalks in the northeastern section but ranged 1-7 in other sections. The second generation almost returned to the fall 1968 level. Controls were used on 195,000 acres. Winter survival in WISCONSIN ranged 92-96 percent from Dane to Portage Counties April 11. Leaf feeding ranged 5-12 percent on July 18 with the heaviest feeding on sweet corn. Up to 40 percent of canning sweet corn was infested July 25; much treatment was made. Eggs were common in southern counties August 29 but scarce in east-central counties. Immediately after eggs were found, treatment for second-generation larvae began. Up to 80 percent of the sweet corn in southern counties was infested with a combination of European corn borer, CORN EARWORM

(Heliothis zea), and FALL ARMYWORM (Spodoptera frugiperda). The fall survey, mostly in field corn, showed a State average of 46 larvae per 100 plants. About 408,260 acres were treated for corn pests in Wisconsin. Winter survival in MICHIGAN was high. Moths peaked the week of July 1; Lenawee County recorded a count of 557 and Livingston County 327. The second generation emerged August 10 and a constant flight was sampled until October 6. Population overlap was evident as the two generations continued to emerge. In October larvae averaged 62 per 100 stalks, a 24-percent increase over 1968. Populations are more concentrated in the southern tier of counties. Control was not satisfactory until 1969. Winter survival in INDIANA was high, one larva per 6.7 feet of cornstalk. Percent infestation was similar to 1968, a year of heavy infestation, but the number of live borers per 100 plants, 39.8, decreased 52 percent. European corn borer adults in OHIO during spring were the heaviest in recent years. Larvae were more abundant than in 1968. First-generation larval infestations averaged 20-30 percent statewide. Heavy infestations of 75 percent or more of the corn occurred in Williams, Fulton, and Lucas Counties where similarly heavy numbers were found last fall. Other counties with 75 percent or heavier infestations were Montgomery, Preble, Highland, Brown, Knox, Warren, Clinton, and Tuscarawas. Adults this spring were the heaviest in recent years. Larvae were more abundant this year than last.

Light throughout WEST VIRGINIA, European corn borer larvae averaged 3 per corn plant. Damage was light to moderate on field corn but heavy on sweet corn. Larvae infested 80 percent of the corn in many widely scattered areas of VIRGINIA, but infestations were generally lighter than last year. Damage ranged light to medium.

European corn borer infestations in MARYLAND dropped sharply from 1968 levels, but damage remained moderate to heavy. June infestations increased rapidly on early planted corn in all counties south of Kent and Prince Georges Counties. By late June, larvae infested 20-40 percent of the fields on the Eastern Shore and 1-10 percent of the fields in Frederick, Carroll, Howard, and Harford Counties. Heavy infestations peaked in early August with the highest levels on the Eastern Shore, 40-100 (average 80) percent, in the southern area 30-100 (average 50) percent, and in the central counties 0-100 (average 70) percent. Controls were needed on 20,000 acres of processing corn. The DELAWARE State average of 357 borers per 100 corn plants during fall 1969 reflects the very high densities infesting several crops statewide. Parasitism of overwintered larvae by Macrocentrus grandii (a braconid) averaged 6.3 percent for the State with the highest percentage (42) in northern New Castle County. Adult flights occurred in three distinct peaks: A low in late May and early June, in mid to late July, and a very high peak from mid-August through early September. In PENNSYLVANIA, overwintered larvae per cornstalk averaged 0.61 in Lancaster County and 1.35 in York County. The first generation infested only 10 percent of the stalks in July compared with over 50 percent in 1968. European corn borer populations were generally light to moderate in NEW JERSEY. Injury to sweet corn was insignificant in treated fields. Second-generation larvae presented no serious problems. Larvae in CONNECTICUT were a severe problem on sweet corn.

STALK BORER (Papaipema nebris) was noneconomic and well below 1968 levels in NEBRASKA. Larvae in eastern KANSAS lightly damaged border rows of some corn. Up to 18 percent of the plants were infested. In ILLINOIS the most severe infestations occurred in Stark and St. Clair Counties. In one area of Stark County, larvae infested the border rows of every cornfield on several farms and in some places, destroyed all the corn. Chemical control was isolated. Stalk borer infested border rows of oats but was scarce in corn in Dane County, WISCONSIN, June 20. In mid-July, damage to corn was minor in Walworth, Rock, Dane, Columbia, Grant, and Trempealeau Counties. Larvae infested up to 50 percent of the plants in border rows of sweet corn in Columbia County. Stalk borer was general in field corn in eastern and central TENNESSEE, with severe damage in isolated areas.

SOUTHWESTERN CORN BORER (*Diatraea grandiosella*) lodged cornstalks in eastern NEW MEXICO. Counts were lighter this season in the southwestern counties and in counties along the Rio Grande. Damage in south-central and southeastern KANSAS was less than in 1968. Most fields in the southern half of the State had light infestations in September and October. Larvae infested up to 40 percent of the corn in southeastern MISSOURI from mid-June through July. The percent of plants girdled was 10.3; the percent of plants infested but not girdled was 21.6. The loss was 1,853,100 bushels. Southwestern corn borer lodged 6.1 percent of the corn in ARKANSAS compared to 5.5 percent in 1968. Populations in ILLINOIS were heavier in Pulaski and Alexander Counties than in 1968. Larvae infested about 50 percent of the plants compared with 22 percent in 1968. Perry, Hamilton, and White Counties are new county records; Franklin County was reported during the year. *D. grandiosella* was serious on corn in northwestern and north-central ALABAMA. Counts were light as far south as Washington County. Montgomery County was a new county record, for a total of 39 counties known to be infested. SUGARCANE BORER (*D. saccharalis*) in FLORIDA bored into 7 percent of the sugarcane joints causing about 7 percent loss of sugar.

FALL ARMYWORM (*Spodoptera frugiperda*) damage in NEW MEXICO was extensive on broomcorn and grain sorghum from August 15 to October 15 in Roosevelt, Curry, and Quay Counties. Infestations in TEXAS were medium on forage sorghum in Jasper County on July 18. Heavy infestations in mid-August occurred in the Rolling Plains and in some north-central counties. Fall armyworm damaged corn and sorghum from July through September in OKLAHOMA. Infestations were heavy in all areas except in the southeastern area at various times during summer. Larvae damaged broomcorn in the south-central area in early August. Losses in eastern KANSAS ranged up to 75 percent in many late corn and sorghum fields in July and August. In September, damage ranged light to moderate on wheat seedlings in many areas. Larval activity was confined to the east, southeast, and south districts of NEBRASKA. One field in Pawnee County had about 65 percent of ears and ear shanks infested. Most fields were less than 2 percent infested. Fall armyworm was heavy in late-planted corn throughout MISSOURI from mid-July through August. Infestations ranged 90-100 percent in many fields. Some corn was killed.

Fall armyworm damaged sweet corn and late field corn early in September in WISCONSIN. Damage to sweet corn was severe in some fields in the southern area where up to 100 percent of the plants were infested. Damage was most significant when fall armyworm infested late sweet corn with CORN EARWORM (*Heliothis zea*) and EUROPEAN CORN BORER (*Ostrinia nubilalis*). Damaging populations of fall armyworm in ILLINOIS were first reported July 10-15 from Gallatin and Massac Counties. Moths from this area concentrated in late corn in the northern half of the State. Extremely late fields were defoliated. Over 202,000 acres were treated. Damage in INDIANA occurred more frequently in 1969 than in at least 4 years. Only a single or a few fields in any county were infested. Whorl damage, usually in late corn, was confined to a single or a few patches in any field. Ear damage was as widespread but far more regular than whorl damage. Damaged ears averaged 11.94 percent statewide, ranging from 6.32 percent in the northern districts to 25.39 percent in the southernmost quarter of the State. Three-fourths of this damage is believed due to fall armyworm. Heaviest fall armyworm infestations in Frederick County, MARYLAND, averaged 10 percent. Damage in this area only occurred on late corn planted for silage. By late August, larvae infested 20-100 percent of 500 acres of corn. Controls were needed at Ceresville and Frederick.

Fall armyworm infested sweet corn most of the year in Palm Beach County, FLORIDA. Larvae comprised about 90 percent of the leaf-feeding insects affecting corn in fall. Controls were applied. Overall populations at Zellwood, Orange County, were lower than in previous years. Fall armyworm was light and scattered on late corn and sorghum throughout ALABAMA. Foliage damage was severe on some late corn in southwest TENNESSEE.

BLACK CUTWORM (*Agrotis ipsilon*) fed on corn in several areas of DELAWARE in mid-June. This species appears to have been increasing in the State during the last few years. Moth catches in blacklight traps and field infestations in MICHIGAN were below the averages for the past two years. Black cutworm caused moderate damage to corn in Waushara, Green, Lake, Adams, and Richland Counties, WISCONSIN, late in May. Damage was light in Dane, Sheboygan, and Adams Counties in early July. About 15,200 acres were treated in Wisconsin. In SOUTH DAKOTA, *Agrotis* spp. damaged corn seedlings in Lyman, Lincoln, Douglas, and Hutchinson Counties during late May and early June. By the end of June much damage occurred from Gregory County east. About 45,000 acres were infested; 9,000 acres were treated. *A. ipsilon* larvae in NEBRASKA were the heaviest on corn in recent years. Damage ranged from less than 1 to 12 percent, mostly in eastern and southeastern areas. Light numbers of *A. ipsilon* damaged some corn seedlings in eastern and central KANSAS in June.

PALE WESTERN CUTWORM (*Agrotis orthogonia*) damaged some corn and sorghum seedlings in west-central and southwestern KANSAS in May and June. Several fields had to be replanted and many were treated. In COLORADO, *A. orthogonia* ranged moderate to heavy on wheat. Larvae peaked in mid-May. Counts ranged 0-15 (averaged 4-6) per linear foot. Controls were effective. Damage ranged light to heavy; loss was moderate. In WYOMING, *A. orthogonia* damaged a few cornfields in Goshen and Laramie Counties. Controls were applied to a few fields.

WESTERN BEAN CUTWORM (*Loxagrotis albicosta*) larvae were heavy and widespread in northeastern and east-central COLORADO. Infestations peaked the last half of August. Larvae ranged 3-16 (average 4-6) per 50 row feet of corn. Larvae were heavy throughout Kit Carson, Yuma, Washington, and Phillips Counties, and scattered in Weld, Morgan, Logan, Sedgwick, and Cheyenne Counties. Damage ranged light to moderate. Controls were used in Morgan and Yuma Counties where populations were heavy in 1968. Larvae in KANSAS infested up to 12 percent of the corn ears in Thomas, Sherman, Wallace, Wichita, and Finney Counties. One field in Thomas County had over half of the ears infested with up to 4 larvae per ear. Sherman, Wallace, and Wichita Counties were reported as new county records. Found in 7 NEBRASKA counties in 1969, this cutworm now infests 54 counties. Flights peaked July 19-24 in Dawson County and at North Platte, Lincoln County. Larvae continued to build up late in July and into August when eggs or young larvae infested 0-30 percent of the corn in eastern, central, and southwestern areas. Most fields were 10 percent or less infested. Damage was negligible. In Dawson County an average of 0.61 larva per ear infested 28 percent of ears in 44 fields. Grain loss was estimated at 0.92 percent per infested ear and at 0.02 percent for all ears examined. Total grain loss in 1968 was estimated at 1.84 percent. Western bean cutworm moths were taken in light traps in Tripp, Fall River, and Meade Counties, SOUTH DAKOTA. These were new county records. Adults were taken in a Bon Homme County light trap in 1968. Larvae of this noctuid could become a major pest of corn in South Dakota.

Larvae of a NOCTUID MOTH (*Pseudoplusia includens*) damaged many sweet corn ears at Zellwood, Orange County, FLORIDA, for the first serious attack on corn. Comprising 95 percent of the looper populations on May 22, larvae infested as much as 50 percent of 300-400 acres of sweet corn at Belle Glade and Pahokee, Palm Beach County. Fall numbers were less abundant.

SORGHUM WEBWORM (*Celama sorghiella*) larvae infested sorghum in southeast KANSAS in early September. Most fields were 8-15 percent infested, but infestations were as as high as 80 percent in a few fields with up to 12 larvae per plant.

NORTHERN CORN ROOTWORM (*Diabrotica longicornis*) adults were collected in Franklin, Marshall, and Madison Counties, ALABAMA, for new county records. Corn yields were so badly reduced by many pests over the State that losses by northern corn rootworm and SOUTHERN CORN ROOTWORM (*D. undecimpunctata howardi*) could not be estimated. *D. longicornis* continued to spread southeastward in MARYLAND with Cecil, Kent, Queen Annes, Caroline, and Talbot Counties recorded as new county records. Lodging due to northern corn rootworm and *D. undecimpunctata howardi* ranged 0-15 percent, an increase over 1968's levels, in Frederick and Carroll Counties. No damage occurred elsewhere. Northern corn rootworm adults, 1-5 per ear, infested 90-100 percent of the ears at Emmitsburg, Frederick County, and Keymar, Carroll County. Continued increase in damage and spread southeastward are expected for the next few years. *Diabrotica longicornis* adults in light traps in New Castle County, DELAWARE, increased greatly over 1968. *D. longicornis* appeared to be somewhat heavier in 1969 than in 1968 in NEW JERSEY, especially in Warren, Hunterdon, and Somerset Counties. Lodging and silk feeding were almost nil. *D. longicornis* has become economically important in PENNSYLVANIA. Levels are high enough to warrant controls in parts of Lycoming, Northumberland, and Union Counties along the Susquehanna River; in Lancaster and York Counties; and in the eastern half of Northampton, Lehigh, and Bucks Counties.

D. longicornis damage to corn roots peaked July 20-25 in OHIO. The first sizable adult counts, 4-5 per silk, appeared the last week of July in the southeast area. By August 20, counts of 2-4 per silk were common in the northwest area, and 10-12 in the north-central area. Corn rootworms are economically important in the southwest area, and rarely a problem in northeast Ohio. *D. longicornis* had damaged corn silks in southern INDIANA by July 11. Averaging fewer than 6 per 10 silks, adults infested fewer than half of the fields. Damage to corn roots was light if it occurred at all. *D. longicornis* and WESTERN CORN ROOTWORM (*D. virgifera*) were light in ILLINOIS. During hatch, extensive rains raised the water table almost to the soil surface. Better chemical control also reduced numbers and the adult population was also low. The State average showed 3 adults per plant. Organic phosphates and carbamates were used on 1,990,138 acres of corn. *D. virgifera* was reported in Champaign and Lake Counties for new county records.

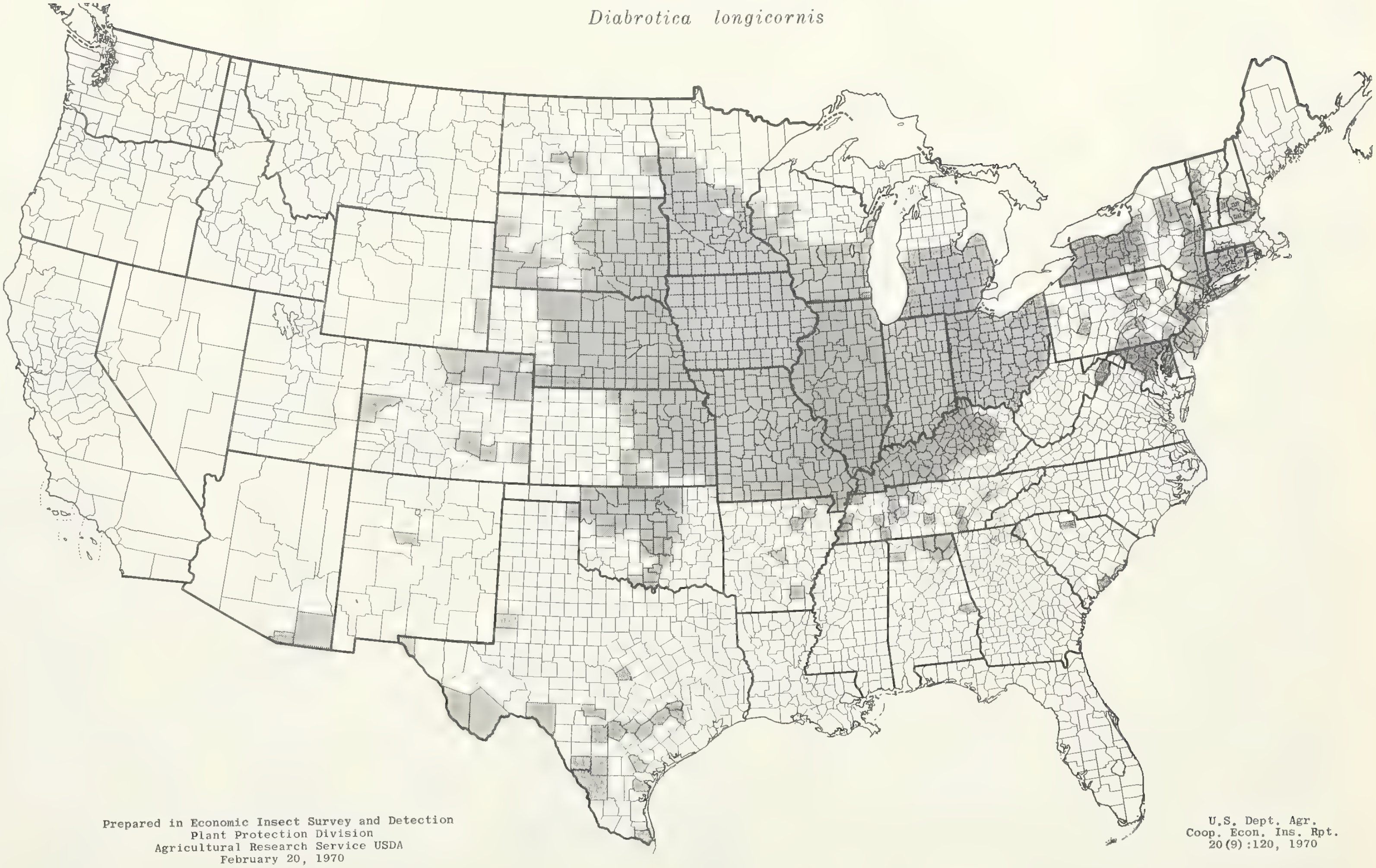
In MICHIGAN only 2 out of 82 fields surveyed showed detectable damage by *D. longicornis*. Population intensity has been decreasing the last few years. *D. longicornis* in WISCONSIN averaged less than 1 larva per corn plant July 25, but some fields had 20+ per root mass. By August 1, untreated fields began to show damage. By August 15, adults averaged about 8 per silk in some southern counties, and some spraying was done. Larval damage was light due to preventive treatments. Lodging was severe in a few fields. Populations appeared lower than in 1968. Larval treatment covered about 678,225 acres; adult treatment covered about 40,000 acres. *D. virgifera* was as high as 15 per corn plant in a few fields in Grant County. This species comprised 10-100 percent of the adult corn rootworms in the southwestern counties. It was more numerous in Grant, Rock, and Dane Counties in 1969 than in 1968. Green County is a new county record. Damage was severe in a few fields.

D. longicornis and *D. virgifera* continued to be a major insect problem on corn in MINNESOTA. Infestations appeared lighter throughout the season. In August adults had increased in the southwest, south-central, and southeast districts and decreased in the west-central, central, and east-central districts. The percentage of western corn rootworms increased in all districts, but the northern corn rootworm continued to be predominant. Most economic infestations in 1970 will occur in the southeast and southwest districts with fewer in the south-central district. Other districts will have widely scattered rootworm problems, but they will be less severe than in 1969. Corn rootworms in IOWA were down in 1969. Lodging was 0.75 percent in 1969 and 6.2 percent in 1968. *D. virgifera* in MISSOURI lodged stalks in Bates County. Because numbers were low, larval damage was not severe in the northern area. Barton, Callaway, Jasper, and Montgomery Counties were new county records.

D. undecimpunctata howardi, *D. longicornis*, and *D. virgifera* in KANSAS caused no more damage than they have for the last three years. Many fields, particularly in north-central and northwest areas, were treated for adults in August and September. At this time, adults ranged up to 35 per plant in some fields in Thomas and Sherman Counties. Northern corn rootworm was reported in Elk County, and western corn rootworm was reported in Sumner, Cowley, Elk, Chautauqua, Wilson, and Labette Counties for new county records. In NEBRASKA 1969 was the least successful year for corn rootworms since 1958. Soil insecticides were adequate and adult damage was minor.

Distribution of Northern Corn Rootworm

Diabrotica longicornis



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Adults were low. Larvae ranged 10-15 per plant in untreated corn at Mead, Saunders County. Diabrotica virgifera adults peaked in late July. Western corn rootworm is expected to increase in 1970. In SOUTH DAKOTA a cool, wet spring in the eastern area delayed hatch of Diabrotica spp. D. virgifera made up at least 80 percent of the rootworm population. Infestations were more general and rootworm populations were heavier than in 1968. Dependent on winter and spring survival, populations are expected to be the same or higher in 1970, compared with 1969. About 1,000,000 acres are treated annually. D. virgifera in NORTH DAKOTA remained light with evident damage. Up to 10 adults per 100 plants occurred in Dickey, Ransom, and Sargent Counties. Traill and Dickey Counties were new county records.

D. virgifera was unchanged in WYOMING. Adults were heaviest, 5-9 per plant, in Goshen and Platte Counties. Controls for larvae and adults were applied in Goshen, Platte, and Laramie Counties. D. virgifera ranged light to moderate on corn in eastern COLORADO. Adults ranged up to 4 per corn plant. Larval damage was light to moderate; adult damage was light. Control was widespread for larvae but isolated for adults.

CORN FLEA BEETLE (Chaetocnema pulicaria) first infested early corn in DELAWARE in late April and early May. Shortly thereafter, injury was severe in several areas where densities reached 4-5 per young corn plant. Heavy numbers of C. pulicaria appeared in MARYLAND in June and early July and peaked in late July and August. Damage was heaviest in Washington, Frederick, and Carroll Counties. Injury ranged light to moderate in 50-90 percent of the fields. Several hundred acres in Frederick County showed conspicuous feeding. C. pulicaria damage was generally light throughout VIRGINIA with a few locally severe infestations in Augusta County. DESERT CORN FLEA BEETLE (C. ectypa) damaged corn and sorghum in UTAH.

WIREWORMS continued to be a problem on sugarcane in the Everglades area of FLORIDA, where 95 percent Melanotus communis and 10 percent Conoderus sp. severely damaged 1,000 acres of young sugarcane planted in the fall. Wireworms reduced stands of corn in the Everglades area. Stand reduction ranged 5-17 percent in some fields without treatment and up to 10 percent with treatment. Wireworms caused spotty, severe damage over VIRGINIA. Damage was severe in Washington and Russell Counties and in parts of Nansemond County. Wireworms were numerous in a few cornfields of Park and Washakie Counties, WYOMING. Some fields had to be replanted. Thousands of CARABID BEETLES (Clivina spp.) per night were sporadically attracted to blacklight traps in ILLINOIS from early June to early July, particularly July 1-8. They were found under almost every clod of dirt in the most heavily infested cornfields. Seed damage was slight where germination was rapid. Stand reduction ranged 20-35 percent in some fields south of Springfield, Sangamon County. Losses in other fields ranged up to 3,000 plants per acre. Overall damage was probably less in 1969 than in 1968.

YELLOW SUGARCANE APHID (Sipha flava) was medium on grain sorghum in Jackson County, TEXAS, in mid-May and in several north-central and Rolling Plains counties. Scattered fields throughout the Blacklands area were severely damaged. Infestations were light to medium in late June and early July in Caldwell and Brazos Counties. Infestations were light on grain sorghum in Crosby and Lubbock Counties during early July. In OKLAHOMA this aphid was heavy on corn and sorghum in north-central, northeast, and east-central areas in late May and June and lighter in the south-central area. Numbers were heavy in the panhandle area in early July. Yellow sugarcane aphid was reported as a new State record for ARKANSAS, being collected on sorghum in Hempstead County in May. Shortly after, it was collected in Washington County; this is a new county record. Infestations were not economic. CORN ROOT APHID (Anuraphis maidiradicis) was found for the first time on corn in NEW JERSEY on August 8, 1969, in a field near Blawenburg, Somerset County.

A DELPHACID PLANTHOPPER (*Saccharosydne saccharivora*) built up heavily late in 1969 on at least 5,000 acres of sugarcane in FLORIDA. Counts of 1-2, occasionally up to 40, per whorl heavily damaged young plants in the Okeechobee and Everglades areas. Biological control has been so effective that apparently not enough hosts were available to maintain the parasite at a desirable level.

WESTERN BROWN STINK BUG (*Euschistus impictiventris*) was heavy on sorghum in ARIZONA in early November. SAY STINK BUG (*Pitedia sayi*) and other species damaged grain sorghum in Luna and Hidalgo Counties, NEW MEXICO. Many growers treated.

SORGHUM MIDGE (*Contarinia sorghicola*) is potentially the major pest of sorghum in ARKANSAS. Infestations were nearly absent in 1969, due probably to early, uniform planting. In Chicot County, 8,000-10,000 acres were treated. Populations on grain sorghum were medium in Maverick County, TEXAS, May 30, and light to medium in Jackson County during early June. During the first half of July, infestations were heavy and spotted on sorghum in the central and Blacklands areas, and medium to heavy in Milam and Robertson Counties during late July. Infestations in the northern panhandle were light. Moderate damage in OKLAHOMA occurred occasionally in the west-central and southwestern areas from mid-August to mid-September. No problems occurred in KANSAS.

SEED-CORN MAGGOT (*Hylemya platura*) damaged sweet corn in Ventura County, CALIFORNIA, and to a lesser degree in other areas of the State. Larvae damaged corn seed in portions of fields in Kosciusko and St. Joseph Counties, INDIANA, in mid-June. In PENNSYLVANIA, *H. platura* and CABBAGE MAGGOT (*H. brassicae*) were heavy and injury was extensive on corn.

BANKS GRASS MITE (*Oligonychus pratensis*) started increasing on silage corn in NEVADA in late July and early August, and ranged medium to heavy in some fields by September in Churchill County where most of the State's crop is grown. Although numbers were lighter than normal, as much treating was done as in prior years due to earlier increases. Late-treated fields generally had higher populations and damage than early treated fields. Infestations were about normal throughout UTAH. Damage was generally moderate to sweet corn but severe in Grand, Sevier, and Weber Counties and scattered areas elsewhere. Numbers in WYOMING remained below economic levels on corn. In TEXAS medium to heavy numbers occurred in the Trans-Pecos area during August.

TWO-SPOTTED SPIDER MITE (*Tetranychus urticae*) was probably the most common species encountered on corn, sorghum, and sugarcane in CALIFORNIA. *Tetranychus* sp. infestations were about normal throughout UTAH. Damage to sweet corn was generally moderate but was severe in Grand, Sevier, and Weber Counties and scattered areas elsewhere. Unspecified SPIDER MITES caused problems in corn throughout most of NEW MEXICO. Yields in Curry County were reduced up to 50 percent in silage corn. *T. urticae* ranged light to moderate on sweet corn in NEW JERSEY.

SLUGS in INDIANA ranged up to 12 per corn plant and 18 per square foot, particularly in fields that had been in alfalfa in 1968. Damage ranged 30-90 percent in scattered fields in west-central and northeastern districts. With damp spring weather in OHIO, GRAY GARDEN SLUG (*Deroceras reticulatum*) economically damaged corn in Clark, Fayette, Highland, Preble, Delaware, and Wayne Counties June 20. Slugs damaged or killed 50-75 percent of the plants in nearly all fields. All fields were 20 inches or less in height. SLUGS in VIRGINIA were severe on corn seedlings in many sod-planted fields in the southwestern area.

SMALL GRAINS

Highlights:

PALE WESTERN CUTWORM heavily damaged wheat in several areas of Wyoming, South Dakota, and Nebraska. FALL ARMYWORM caused heavy losses to fall sown wheat in New Mexico. Damage and populations were variable in several other States. ENGLISH GRAIN APHID populations were down in Idaho and counts in South Dakota and Minnesota were below treatment levels in most areas. Predator populations were variable. BROWN WHEAT MITE was reported for the first time from North Dakota. South Dakota growers treated about 20,000 acres, and 30,000 acres was left untreated. HESSIAN FLY was kept under control in most States due to planting dates and use of resistant wheat varieties.

PALE WESTERN CUTWORM (*Agrotis orthogonia*) was heavier than in 1968 in WYOMING, and heavily damaged wheatfields in Goshen, Platte, and Laramie Counties in April and May. Controls were limited to a few fields. Counts averaged up to 8 per linear foot in the more heavily infested fields. Noneconomic populations in SOUTH DAKOTA infested 2 winter wheatfields near Ideal, Tripp County, the first week of May. Economic populations during the third week of May damaged winter wheat near Okaton, Jones County, at Stanford, Jackson County, and west of Billsburg, Haakon County. Damage was severe in spots. For the second consecutive year wheat was heavily damaged in NEBRASKA. Another outbreak is predicted for 1970. About 250,000 acres in the southwest and southern panhandle areas was treated. Egg hatch and early signs of feeding damage were observed March 23-26 in Dundy and Chase Counties. Larval counts of 8-12 per linear foot were common in Chase, Dundy, and Perkins Counties. Injury was accentuated by dry conditions. Damage by pale western cutworm had peaked in most areas of Nebraska by late May. A few instances of damage in late May and early June occurred when corn was planted following wheat that had been destroyed by *A. orthogonia*. One 80-acre cornfield in Hayes County was totally destroyed. Fall moth flights compared in size to those of 1968; moth flights in 1968 were the largest ever recorded. In KANSAS blacklight catches were in the thousands in Finney and Stevens Counties during fall 1968. The first 1969 larvae were found 30 days later than in 1968. Expected highs were not reached, probably due to wet soils at hatch. A few fields in the southwest area were treated. Pale western cutworm caused scattered damage to small grains in the panhandle area of OKLAHOMA in late April and early May.

FALL ARMYWORM (*Spodoptera frugiperda*) caused heavy losses in fall-sown wheat during September and October in eastern NEW MEXICO. About 60 percent of wheat was lost in the Causey, Rogers, and Arch areas of Roosevelt County. Similar losses occurred in Lea and Curry Counties. Damage occurred on about 20,000 acres of wheat and rye in Quay County. Many growers in this area either replanted or disced the remaining crop. Infestations were heavy throughout TEXAS during 1969. Fall armyworm was heavy on wheat in Kent County, and in several High Plains counties in mid-September. During the same period it was heavy in isolated areas of Martin County. Populations were moderate to heavy on wheat in the Rolling Plains during late September. Heavy infestations were noted during early October throughout Texas on oats and other small grains. Populations were decreasing in the High Plains. Damage was medium to heavy in the central, north-central, and Rolling Plains areas the first 2 weeks of October. Controls were applied at that time. Populations had decreased in the Blacklands in late October. Fall armyworm infested small grains in the western half of OKLAHOMA from early September through mid-November. Two generations of larvae destroyed volunteer and planted fields in many areas. Counts on young wheat were very heavy and required treatment in September and October in Lafayette and Independence Counties, ARKANSAS. Fall armyworm damage in NEBRASKA averaged less than 1 percent in 15 fields examined in Jefferson, Gage, and Saline Counties in September. Most damage was observed in early planted fields. Some control was reported. Fall armyworm caused spotty damage to rye and barley seedlings in October in Isle of Wight and Buckingham Counties, VIRGINIA.

Larvae of GRASSWORMS (Mocis spp.) were noted in mixed populations with other noctuid larvae in several hundred acres of oats and rye from Geneva County north to Montgomery County, ALABAMA. This was the first report of these pests in Alabama in several years.

LESSER CORNSTALK BORER (Elasmopalpus lignosellus) was heavy in wheat in Beckham County and moderate in several south-central and southwest counties of OKLAHOMA in early and mid-October. OMNIVOROUS LEAF TIER (Cnephasia longana) appeared in unusually large numbers in the spring of 1969 and wheat was damaged in the Willamette Valley of OREGON. Populations appear to have been much higher than in the last few years, especially in Marion and Washington Counties.

ENGLISH GRAIN APHID (Macrosiphum avenae) populations in early July were generally lower than in 1968 in southern IDAHO. In early August infestations were scattered throughout the upper Snake River plains area. On July 17 a 9-acre barley field at Gooding, Gooding County, warranted control. Populations were down in the Boise Valley and fewer wheatfields were treated than in 1968. In SOUTH DAKOTA, this aphid became established on 2 to 3-leaf oats the first week of May in northern Clay County and eastern Hamlin County. Nymphs ranged 2-45 per 40 row feet. Infestations had developed during the cool spring, and were reported on oats the third week of June in Grant, Hamlin, and Aurora Counties, and on barley in Kingsbury County. Controls were not recommended since counts did not exceed 50 per plant. In MINNESOTA, winged forms were found April 13 at St. Paul, Ramsey County. Late June counts in small grain, primarily oats, increased sharply in the sandy soil areas of the east-central district. Up to 250 aphids per row foot were found in Dakota, Anoka, Sherburne, Benton, Isanti, and Hennepin Counties during the week of June 16. English grain aphid was heaviest on small grain 6 inches or higher; counts were lighter on younger grain. Predator populations were variable but most fields had low counts, probably due to the cool spring. M. avenae damage was very evident due to high counts and near drought conditions in the light sandy soil areas. Little if any spraying was done. Most infested fields recovered well with adequate rainfall and higher temperatures in July. This pest caused problems for at least 3 weeks in Minnesota.

Alates of English grain aphid were detected in grass at Prairie du Chien, Crawford County, WISCONSIN, April 18. Nymphs ranged 3-5 per sweep in rye in Sauk and Crawford Counties May 9. Elsewhere, 5 per 100 sweeps was average, with 50 percent being alates. Counts ranged 12-30 per 100 sweeps in oats June 13 in southeastern counties, averaged 1 per sweep in central counties, and ranged 60-100 per 100 sweeps in southwestern counties. Counts of 100 per leaf occurred in Chippewa County June 27. Some spraying was reported in Chippewa and Trempealeau Counties. This pest caused much concern in Vernon, Clark, Walworth, and Buffalo Counties. Red leaf (barley yellow dwarf) averaged less than 5 percent statewide July 4. About 6,785 acres were treated in Wisconsin. English grain aphid peaked June 18 at 37.38 per square foot (1.7 aphids per stem) and at 1.44 per stem in 2 oatfields in north-central INDIANA. About 20 percent of the population was parasitized as of June 27. It was of no economic importance. English grain aphid ranged 50-100 per 100 sweeps of small grain in northwest ARKANSAS by late January. Counts ranged 40-50 per 100 sweeps in late February and had increased to 300-400 by early April. This pest infested small grain in OKLAHOMA from late January to mid-May. In early May, counts were heavy in scattered areas. English grain aphid occurred on heads of developing wheat in numerous fields in several southern counties of ALABAMA, but no damage was reported.

The heavy populations of English grain aphid, Rhopalosiphum padi, and Acyrthosiphon dirhodum present in small grains in the fall of 1968 in OREGON, apparently were influenced by the prolonged rainfall of August 1968. Low populations were observed in August 1969 in scattered areas of the Willamette Valley. No grain aphids were observed in the Klamath Falls area of Klamath County. There was no incidence of barley yellow dwarf noted on cereals in Oregon in 1969. In CALIFORNIA, R. padi damaged small grain, primarily barley. Much yellowing occurred early in the season in conjunction with excess moisture. Light numbers of R. padi occurred in small grains from late January to late March in OKLAHOMA. Fall activity began in early October. This aphid was heavy in rye in the west-central area in mid-October.

WINTER GRAIN MITE (Penthaleus major) was very abundant in part of a bluegrass seed field west of Imbler, Union County, OREGON, at the end of April. Light populations were first detected damaging small grains in Denton County, TEXAS, in mid-January. It was heavy on wheat in Archer and Wichita Counties, and ranged up to 1,000 per linear foot in some fields. Infestations were light to heavy on small grains in the Rolling Plains until the last part of March. Numbers were light to moderate from early February to mid-April in OKLAHOMA. Infestations were scattered and heavy in several south-central and southwest counties in mid-December.

BROWN WHEAT MITE (Petrobia latens) was reported in NORTH DAKOTA for a new State record. Up to 9 per leaf were found in winter wheat in Golden Valley County on June 6. Other infestations in Bowman, Hettinger, and Williams Counties were reported as new county records. Populations developed during April, May, and early June on wheat in Meade, Butte, Harding, eastern Pennington, and Jones Counties, SOUTH DAKOTA. Infestations were severe enough (a minimum of 20-25 mites per plant) to yellow and mottle the wheat. About 20,000 acres were sprayed with another 30,000 acres left untreated. Brown wheat mite was reported only from Cimarron County in OKLAHOMA in late April. Populations subsided following spring rains in UTAH. Brown wheat mite was locally damaging in a few counties, but was generally below normal in 1969. Light populations of this mite caused minor damage to grains in WYOMING. A few wheatfields in the Iowa Center and Lingle areas of Goshen County required controls. Brown wheat mite populations were light in NEVADA. Light to medium damage was noted in May and June in Pershing County. Irrigation was generally used as a control measure.

HESSIAN FLY (Mayetiola destructor) Race B infestations in INDIANA averaged 2.2 percent in Monon and 4.7 percent in Arthur wheat varieties. These wheat varieties are W38 resistant. The highest infestation in the non-Race B resistant wheats occurred in the northwest district. Infestations in the two adjacent districts were the next highest. The highest infestation rate usually occurs in the southwest district. Benhur, a Race B resistant wheat variety, had a 0.4-percent infestation rate in 1969, compared with 0.2 percent in 1968. In ILLINOIS, puparia averaged 2 per 100 tillers. Hessian fly infestations increased in wheat areas of NEBRASKA as growers failed to observe fly-safe planting dates. Percent of stems infested by district were as follows: South 4.5, southeast 2.8, and central 2.4. The 2-percent infestation in the panhandle area was unusually high. Based on 1968 acreage figures, the loss in Nebraska for 1969 was estimated at 318,435 bushels of wheat. Hessian fly infestations in KANSAS were greater than any year since 1961. Conditions were favorable for fall and spring generations. Late development of the spring generation had placed the "flaxseed" 3 or 4 inches above the ground on well-developed culms. Damage was estimated at nearly 2,000,000 bushels. This was about 4 times the 1968 infestation but below the annual damage before use of resistant wheat varieties. A total of 571 fields was sampled. Good farming practices of registered seed growers are holding infestations to less than one-half of that experienced by other wheat growers. This pest was noted in some winter wheat plots at Aurora, Marion County, OREGON.

WHEAT STEM SAWFLY (Cephus cinctus) cut an average of 0.5 percent of the stems in 44 percent of the fields in 24 western counties of NORTH DAKOTA. Decreases are attributed to the large acreages of Fortuna wheat and to the increased acreages of durum in the northwestern counties.

RICE WATER WEEVIL (Lissorhoptrus oryzophilus) has developed a resistance to the chlorinated hydrocarbon used as a seed treatment in ARKANSAS. About 80 percent of the rice acreage was treated at a cost of $412,000. Drainage was also used for control. This weevil was serious on plantings in most rice-growing areas of CALIFORNIA.

RICE STINK BUG (Oebalus pugnax) first appeared in low numbers on small grain in ARKANSAS in May. A few rice fields in the east-central area were treated in late July. These fields contained barnyard grass.

Unspecified WIREWORMS in damaging numbers infested all crops throughout NORTH DAKOTA. Many untreated fields were reseeded. Stands in other fields were reduced up to 40 percent. The heaviest populations occurred in fields that had been in soil bank in 1968.

Overwintering adults of BARLEY THRIPS (Limothrips denticornis) had migrated into headed rye by the end of May in Cass, Richland, and Ransom Counties, NORTH DAKOTA. By June 13, thrips had entered leaf sheaths in barley fields. Counts were less than 2 per plant in Cass, Barnes, Griggs, Steele, Traill, Grand Forks, and Walsh Counties. Up to 14 per plant were noted in scattered barley fields in McKenzie and Billings Counties, but damage was not extensive.

TURF, PASTURES, RANGELAND

Highlights:

FALL ARMYWORM infestations varied light to heavy in Texas, Oklahoma, and Arkansas. SOD WEBWORMS damaged lawns in eastern Kansas in August, and continued to be major lawn pests in California. WESTERN TENT CATERPILLAR damaged range areas in Utah. SOUTHERN CHINCH BUG damaged St. Augustine grass pastures in Florida and lawns in Alabama.

FALL ARMYWORM (Spodoptera frugiperda) ranged light to heavy on grasses over wide areas of TEXAS during late summer and fall of 1969. Damage was moderate to heavy to lawn and pasture grasses in the northwest, west-central, central, southwest, south-central, and southeast areas of OKLAHOMA. Infestations in ARKANSAS were heavy and widespread especially in the southern area where rainfall was extremely low. Many pastures had to be treated.

SOD WEBWORMS (Crambus spp.) caused light to moderate damage to several bluegrass lawns in Prince Georges and Montgomery Counties, MARYLAND. Adult flights were heavy in May from east and middle TENNESSEE. Damage was moderate to corn and lawn grasses in eastern areas, and moth flights were heavy in central areas during July. Large flights were observed again in middle Tennessee in September BLUEGRASS WEBWORM (C. teterrellus) caused very little damage to lawns in KANSAS until early August. At this time damage was as severe or more so than in past years in the eastern area. Early rain reduced damage. Crambus spp. caused fewer problems than in 1968 in NEBRASKA. Most lawns at Lincoln, Lancaster County, checked for webworms in August had less than 1 per square yard. A few had 8-9 per square yard. Larvae averaged 4 per square foot in a lawn in Scottsbluff, Scotts Bluff County, on May 6. The first moths, probably C. toparius, were noted May 3 at Moscow, Latah County, IDAHO. Moth activity continued until late September. One lawn at Lewiston, Nez Perce County, required control as early as May 21. Larvae in bluegrass ranged from 1 to 13 per 3-inch diameter crown at Post Falls, Kootenai County, in August. C. bonifatellus continued to be a major lawn pest in CALIFORNIA.

SAGEBRUSH DEFOLIATOR (Aroga websteri) increased in areas of Elko and Humboldt Counties, NEVADA, where damage to sagebrush (Artemisia tridentata) was heavy. Damage was below normal in UTAH.

WESTERN TENT CATERPILLAR (Malacosoma californicum fragile) damaged range areas in San Juan, Grand, and Washington Counties, UTAH. However, populations were lighter than previously in these areas. Larvae damaged a large area of bitterbrush in the mountains of Sevier County, where damage was very severe in 1967 and 1968. Chokecherry, serviceberry, and other range plants also were damaged.

WESTERN TUSSOCK MOTH (*Hemerocampa vetusta*) infestations and damage to bitterbrush (*Purshia tridentata*) were light to medium but with spotted, locally heavy areas of damage in Douglas, Ormsby and southern Washoe Counties, NEVADA, in May and June. In the same areas damage and populations on desert peach (*Prunus andersonii*) were light.

BILLBUGS (*Sphenophorus* spp.) were of some concern in 1969. *S. venatus vestitus* increased its range in CALIFORNIA, being reported for the first time in San Joaquin County. In UTAH, BLUEGRASS BILLBUG (*S. parvulus*) extended its range in Salt Lake County. *S. venatus vestitus* was less damaging to zoysia lawns in KANSAS than in 1968, probably due to more rainfall in 1969. Adults and larvae occurred in mixed populations in December 1968 and from April through September 1969. It is believed these two stages may be found anytime during the year in Kansas. In NEBRASKA, bluegrass billbug damaged some lawns at Lincoln, Lancaster County, in July. Much of the damage attributed to this insect in 1969 was due to drought, heat stress, and disease. Infestation levels were generally below those of 1968 in Nebraska. Adults of *S. minimus* caused heavy damage to roots and crowns of orchard grass in Providence County, RHODE ISLAND.

WHITE GRUBS caused some damage in several States. *Phyllophaga farcta* larvae were heavy in native grasses in Kinney County, and in several northern counties of TEXAS. *P. anxia* destroyed several sandhills meadows in Cherry County, NEBRASKA, but was not as widespread a problem as in 1967 and 1968. First damage was noted on May 15 in Cherry County. Grubs ranged 40-109 per square yard in severely damaged meadows. *Cyclocephala* sp. was the most abundant white grub in lawns in central and western PENNSYLVANIA during September. Populations of 10 or more grubs per square foot were common. Additional damage to the infested turf was caused by skunks digging for grubs. Unspecified white grubs caused severe damage to 75 acres of clover and grass mixture pasture in Hardeman County, TENNESSEE. Damage of this type and severity is uncommon. Unspecified species damaged turf and pasture during summer and early fall in FLORIDA. One pasture had 30 acres heavily damaged. Damage in other pastures ranged from spots of a few feet in diameter to 0.25 acre in size. These pests caused considerable loss of grazing at Belle Glade, Palm Beach County.

CHINCH BUG (*Blissus leucopterus*) had severely damaged some lawns in Kent County, RHODE ISLAND, by June 6. Complaints were received from throughout the State. Adults were active as late as October 9 in Kent, Providence, and Washington Counties. Infestation in 1969 was the worst known in the State. Adults were recovered from many sod samples in WEST VIRGINIA collected from lawns showing early browning in Ohio, Marshall, Wetzel, and Monongalia Counties. Chinch bug was conspicuous in ILLINOIS in 1969 due to its absence. Populations were low during the fall survey. The highest count was 88.3 bugs per square foot of hibernating material collected in Champaign County. Overwintered adults were very light in KANSAS in late February. Populations were noneconomic in corn and sorghum during spring and summer. Chinch bug caused light to moderate damage to St. Augustine grass lawns in southeast OKLAHOMA, and again in the south-central area in early August.

SOUTHERN CHINCH BUG (*Blissus insularis*) was heavy in most areas of central and north-central TEXAS during 1969, due primarily to very dry conditions. This pest remained serious on St. Augustine grass in central and southern ALABAMA. Damage and difficulty with controls caused many homeowners to replace St. Augustine grass with other grasses. Southern chinch bug caused heavy spot damage to St. Augustine grass pastures in the Everglades area of FLORIDA despite rather wet conditions during summer and fall. Infested spots ranged from a few feet in diameter to over one acre. This chinch bug was found for the first time in Sacramento County, CALIFORNIA. It has been recorded from Los Angeles and Orange Counties also. CHINCH BUGS (*Blissus* spp.) were a problem on lawns at Astoria in Clatsop County, OREGON, and caused moderate to heavy damage to several lawns in Montgomery and Prince Georges Counties, MARYLAND.

TWO-LINED SPITTLEBUG (Prosapia bicincta) light trap collections were heavier at Belle Glade, Palm Beach County, FLORIDA, than in any previous year of record. However, damage appeared to be less than usual. Damage was moderate on ranches in the Everglades area, where past damage was usually severe. This spittlebug damaged 55 acres of Coastal Bermuda grass at Alachua, Alachua County, during September. Several centipede grass lawns were damaged and the pest was abundant in St. Augustine grass at Gainesville in August. Two-lined spittlebug reoccurred in early spring throughout ALABAMA. It was mainly a pest of Coastal Bermuda grass in central and southern areas, and lawns in isolated parts of the southeast and southwest areas.

SAY STINK BUG (Pitedia sayi) was heavy on rangeland hosts in NEVADA. Beginning in May, economic infestations failed to develop on cultivated crops except on small, isolated acreages.

CICADAS, mostly Okanagana spp. and some Platypedia spp. were heavy in northern NEVADA from late May through mid-July but less so than in 1967. Damage to native shrubs and trees from oviposition was evident. Okanagana spp. and Platypedia spp. were numerous in various canyons and brush areas of UTAH.

Melanoplus femurrubrum, M. differentialis, and Schistocerca americana were the most important GRASSHOPPERS in ALABAMA in 1969. Occurrence was statewide, with M. femurrubrum predominant. Most serious damage was to 2- to 6-leaf clover seedlings in pastures in the fall and to reseeded sod where grasshoppers, in combination with CRICKETS, destroyed many seedling plants and weakened stands. In FLORIDA, Schistocerca obscura occurred in large numbers in the Everglades area. Preferred hosts were elderberry and other wild plants. Several heavy stands of elderberry were defoliated and debarked. Damage ranged light to heavy on Para grass and was light to St. Augustine grass.

A CRICKET (Nemobius fasciatus) remained a pest of crimson, white, and other clovers in pastures and sod throughout the Black Belt counties of central and western ALABAMA from September through November. Damage was caused by heavy population buildups during the year. Crickets fed on clover seedlings, weakening or destroying stands.

BANKS GRASS MITE (Oligonychus pratensis) developed heavy, damaging populations on timothy hay in Lyon County, NEVADA, in May. Controls were required. BROWN WHEAT MITE (Petrobia latens) was moderate on crested wheatgrass and roadside grasses in some localities of UTAH.

GRASS THRIPS (Anaphothrips obscurus) were heavy and damaged timothy hay in Lyon County, NEVADA, in May. Controls were required.

A SNAIL (Bulimulus guadalupensis) was found in a nursery on Snead Island, Palmetto, Manatee County, FLORIDA, in October, and reported as a new United States record. This snail is not considered to be economically important.

Weather of the week continued from page 100.
Temperatures averaged above normal over the West in spite of cooler temperatures late in the week. In some areas, this was the sixth consecutive week with warmer than normal temperatures. Much of the northern and central Rocky Mountains and the central Plains averaged 6-12° warmer than normal. Most of the area south of a line from El Paso, Texas, to Alpena, Michigan, averaged cooler than normal. In general, this area was coolest at midweek. (Summary supplied by Environmental Data Service, ESSA.)

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